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ABSTRACT

This revised edition of a 1955 publication is designed to help those who have chosen careers in engineering or science, and in particular, those who wish to pursue their technical training in some association with industry on leaving school. The introduction discusses: changes in this edition; trends in sandwich training; industrial awards; how to qualify as an engineer (university entrance, CNAA degrees, HND, the CEI Examination, and technicians), application to firms. Section 1, Students in Engineering and Science, lists firms in alphabetical order showing the products, the subjects in which they offer training, age limits, pattern of training, and availability of sponsorship at colleges. Section 2, Group Apprenticeships, discusses The Engineering Industries Group Apprenticeship and The Scottish Electrical Training Scheme. Section 3, Industrial Awards for Degree Courses, includes firms and other organizations offering full support (maintenance and fees, or salary) for students at university or polytechnic. Section 4, Training with the Armed Forces, presents engineering and science training schemes in the Army, the Royal Navy and the Royal Air Force. In Section 5, The Professional Institutions, The Council of Engineering Institutions, its constituent professional bodies, and the other main professional institutions in engineering and science fields are discussed. An index, bibliography, and glossary are provided. (DB)

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Public Schools Appointments Bureau

ENGINEERING AND SCIENTIFIC TRAINING SCHEMES

Edited by Joan Hills

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Engineering and Scientific Training Schemes

including Industrial Awards for Degree Courses

For those leaving school in 1972 and 1973

Published by The Public Schools Appointments Bureau

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Preface

by E. R. L. Lewis
Chief Adviser on Industrial Training,
Department of Employment

YOUNG MEN AND WOMEN setting out on a career have two problems to solve. The first is, of course, deciding on the career they wish to follow. Many factors affect this choice, both rational and personal, but in my view it is not too important how the choice is made provided that it stems from an interest in the kind of work involved, that the individual has the necessary ability and aptitudes for the job, and, most important, that he develops a determination to succeed. Clearly, one should choose a job with a future.

This book is to help those who have chosen careers in engineering or science. We have a long history of highly technical industry in this country. Railway traction, and more recently radio and television, were first developed and operated in Britain. We had the world's first atomic power stations. The industry will be as important in the future as it ever was and will continue to need highly able and well qualified entrants. Advances in technology extend the scope of the industry and widen the range of skills and academic disciplines needed by it.

This leads us to the second problem. Having chosen this career, how do you set about obtaining the necessary education and training? Many booklets are published by firms describing the opportunities they provide and the courses they run. The difficulty arises in having all this relevant information readily available. The Public Schools Appointments Bureau was the first organisation to tackle this problem when it published the first edition of this reference book in 1955. It has provided an invaluable service which is clearly demonstrated by the fact that it is now in its ninth edition. As someone directly responsible for industrial training schemes for many years, I have become very conscious of the practical assistance it has provided to many young people seeking technical training in industry and I very much welcome the initiative of the P.S.A.B. in bringing out this new edition. Although I am not writing this on behalf of the Department of Employment, the latter has a special interest in the placement of young people in employment and the stimulation of good industrial training and warmly supports all measures to disseminate information about the opportunities available.

This book is particularly designed to help those who wish to pursue their technical training in some association with industry on leaving school. This can have several advantages. Besides the financial assistance which is sometimes available, the student can obtain experience of the practical world of engineering and science and their application to real problems. Firms can be helpful in providing industrial training and guidance on such matters as the most appropriate courses or subjects to study at college. Firms are very ready to give what help and guidance they can.

In particular, this book contains a wealth of information which can be readily extracted, and will repay careful study.

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Introduction

Changes in this edition

As our new edition of 'Engineering and Scientific Training Schemes' is already a year behind schedule, we decided to produce it this year in spite of the present chilly employment climate, one effect of which has been a reduction in the number of industrial firms wishing to appear in a publication of this nature. All the organisations included in the 1967 edition were asked to revise their material, but many replied that they were taking no students this year and were unable to commit themselves to doing so next year or the one after that; while other firms simply did not reply, and have therefore been omitted.

As the Confederation of British Industry commented in a recent statement, no one is immune from the effects of economic change, but before making severe cuts in recruitment firms should consider carefully whether such cuts 'might have damaging effects on their long term prospects for achieving a balanced supply of qualified manpower at different levels of activity, and create disruptions in their age structures'.

The omission of so many firms has resulted in a somewhat slimmer publication than before, and we have reduced its size still further by amalgamating the science training schemes, which previously had a separate section, into the engineering section, so that many firms which formerly appeared twice now have only one entry. This should not occasion any difficulty to users, since the *Index* at Section 6 lists the firms under the branches of engineering or science in which they offer training.

We have made still another reduction in size by omitting the column which previously gave details of entry qualifications. Now that most engineers train by way of a degree course, entry qualification consists in the main of obtaining a place at a university or college, and is no longer a matter for local decision by the firm. A few Government or public organisations (e.g. the Post Office) still have their own minimum qualifications apart from the attainment of a college place; but these are exceptional.

As we have fewer entries this time we have tried to provide fuller information about training arrangements than in previous editions. Many employers have preferences as to the universities or colleges their students should attend, often on grounds of locality – it is easier for tutorial staff and training officers to co-ordinate their activities if college and works are not too far apart. Another reason for preferring a particular course at a particular college is that it fits in with the firm's own activities and training programme. Wherever possible, we have ascertained from the firm whether there are any such restrictions or preferences, and have given the resulting information in the fourth column of Section 1.

Students intending to apply to the firm concerned will thus be able to include one of the preferred universities on their U.C.C.A. form; while applicants for polytechnics or colleges of technology will be able to start enquiries with an appropriate establishment at the same time as they write to the firm.

We have also given, wherever possible, the approximate size of the firm's annual intake of students, but at a time when so many companies are uncertain about the future it is not easy for them to be specific about numbers.

Finally, we have added a bibliography (Section 7) of essential reference books on higher and further education and general careers literature relating to engineering and science careers.

Trends in sandwich training

Since the brochure last appeared there has been a general move among employers away from the 1:3:1 course, by which the student spends a preliminary year in industry (nine months in the case of Oxbridge entrants), three years

Terminology used in Technical Education

A number of terms commonly used in technical education, which may not be familiar to the reader, will be found in these pages. An explanation of the principal terms and abbreviations, together with definitions of the difference between a technologist and technician, and between block release courses and sandwich courses, etc, will be found in the **Glossary** *(Section 8) on p. 106.*

at university, and a postgraduate training year with the firm. In the past, firms have been very willing to take students on this basis, but, as a study of Section 1 column 4 will show, the 1:3:1 course has now become the exception rather than the rule.

This is an important change. The P.S.A.B.'s annual statistics of leavers show that most Public School boys still intend to qualify through the full-time or 1:3:1 university course at a traditional university. Out of 1578 candidates who left our member schools in 1970 to take up engineering, 1083 were applying for full-time university courses, but only 63 for thin sandwich courses at technological universities, and 245 for full-time or sandwich courses at other colleges (which includes the polytechnics). If industry is becoming less interested in the 1:3:1 course, while the majority of school leavers are still opting for it, the latter might be faced with considerable difficulty in arranging any pre-entry practical training.

Some firms appear to have given up this type of training because they found that the student seldom became integrated into the company or wished to join it on completion of his course. They instanced the not uncommon case of the student who failed even to return for his postgraduate year, so that all they had done was provide him with some pre-university training at considerable cost to themselves. In the present economic situation, it is natural that industry should tend to move away from the philanthropic attitude towards training which has been characteristic of it for so long, and look for some material return on expenditure.

The Engineering Industry Training Board has played a part in encouraging the swing towards the thin sandwich course by providing firms with a special grant for the student's first industrial period, which would otherwise be very expensive for the company. No similar grant exists for the training of 1:3:1 students. But a more fundamental reason for the change of emphasis is probably the enormous improvement which has taken piace in sandwich course training in recent years. Close co-operation between industrial training officers and university and polytechnic tutors can and does produce a truly integrated course, the end product of which is a first-class engineer of the kind that industry wants.

It is not surprising then, that most industrial sponsorship is now concentrated on the thin sandwich at technological universities and polytechnics, by which the student spends half of each year with the firm and half at college, and is much more likely to regard himself as a member of the company.

A word of advice for school leavers who intend to take thin sandwich courses. Most of them are probably applying to be sponsored by firms, but some will be applying to become college-based students, which means that the college will be responsible for arranging their practical training periods in industry. In the past there has been no difficulty about this; but in present economic circumstances employers are beginning to show reluctance to offer training places for college-based students. The colleges, keen to fill all their places, are sometimes tempted to accept students without being quite sure that industrial places will be available when the time comes, and it is evident that some of them are already having considerable difficulty in arranging appropriate experience for their students. We think, therefore, that school leavers would be wise to become sponsored by a firm if they can, at the outset of the course. Most of the 200 or more employers listed in this brochure are willing to sponsor students, though not, perhaps, in such large numbers as in the past.

Industrial Awards

The reduction in 1:3:1 courses has naturally been accompanied by a cut in scholarship schemes providing full support (maintenance and fees, or salary) for the full-time student while at university: nor has there been any noticeable increase in full support at college for the thin sandwich student. Some familiar names have disappeared from Section 3 of this brochure, *INDUSTRIAL AWARDS FOR DEGREE COURSES.* Caltex Oil, Crompton Parkinson, Davy and United Engineering, Dunlop, Alfred Herbert Group, H.M. Hobson, Parkinson-Cowan, Rolls-Royce, Unilever, Vickers, Viyella, and all the steel companies constituting the British Steel Corporation have discontinued their schemes.

We have, it is true, been able to add a few new schemes, including those of BP Chemicals International, Burmah Oil Trading, Ford, Hayward Tyler, H. J. Heinz, and London Transport. But in general the largest sector of the employment market which is continuing to keep up full-support schemes for degrees is the Government Department/public corporation sector, which perhaps does not react quite so quickly as the rest of industry to economic fluctuations.

The number of firms willing to support students on degree courses in non-technical subjects is much diminished, as the brief list on p. 100 will show.

However, most students can obtain L.E.A. grants, and it is now almost standard practice for a firm to supplement the grant as far as the regulations allow without occasioning a reduction in the grant. This means that the firm may provide a 1:3:1 student with £100 per annum and a man on a thin (6 months:6 months) sandwich course with £66 per annum in addition to the L.E.A. grant. The employer may also pay National Health Insurance. Our symbol 'Sch' in the final column of Section 1 shows which firms provide supplementary support of this kind. Where full support is provided, the letters 'Sch' are followed by a reference to further information in Section 3. In just a few instances firms providing full support do not have a separate entry in

Section 3, and in these cases we have inserted an explanatory note in the final column after the letters 'Sch'.

HOW TO QUALIFY AS AN ENGINEER

To become a Chartered Engineer (abbreviation 'C.Eng.') it is necessary to be elected a corporate member of one of the professional Institutions listed in Section 5 (p. 77). This requires:

(a) an academic qualification of degree standard acceptable to the Council of Engineering Institutions;
(b) a period of training and experience of at least three years;
(c) minimum age of 25;
(d) registration by the C.E.I. for the qualification C.Eng.

The academic qualification can be satisfied in several ways, as shown by the chart on p. 78. The training and experience requirements are slightly different for the different Institutions, to whom requests for information should be sent.

The main routes are the full-time university degree course of three or four years' duration, followed by a two-year period of practical training; a full-time degree course preceded and followed by a year of practical training, which is known as a thick sandwich or 1:3:1 course: or a thin sandwich course of four years' duration, dividing each year between industry and college, either at a technological university (Aston in Birmingham, Bath, Bradford, Brunel, City, Loughborough, Salford, Surrey, and University of Wales Institute of Science and Technology) or at a polytechnic or college of technology. There is also a 2:1:1 sandwich pattern, with the third year spent in industry and the remaining three years at a polytechnic: and a number of variations on the thin sandwich form are to be found at the different colleges. A three-year thin sandwich course for H.N.D. can also lead on to full professional qualification.

The examinations of the *Council of Engineering Institutions* provide a route for the H.N.D. graduate and for other students who have been unable to qualify by means of a degree course. More details about the C.E.I. examinations are given in subsequent paragraphs. (Also see Section 5, p. 77.)

University entrance

Students should refer in the first instance to 'A Compendium of University Entrance Requirements' published by the Association of Commonwealth Universities and available at all schools (see Section 7, Bibliography). This gives details both of General Requirements and Course Requirements. Entrance qualifications are, however, extremely complicated, and the student will gain much enlightenment by reading the 'CRAC Degree Course Guide' on the subject he wishes to study (see Section 7, Bibliography).

Students must first satisfy the university *General Requirement* for entry, usually involving the possession of passes in five approved subjects at 'O' and 'A' level, no subject to be counted at both levels, the passes to include at least two subjects at 'A' level. Where three 'A' levels are offered, many universities reduce the number of required subjects to four. Most universities require an English Language qualification. General Requirements in the Scottish Certificate of Education (S.C.E.) vary very much between universities, and a Higher Grade is seldom equated with 'A' level G.C.E. Three, four, or even five H grades may be asked for by universities which only require two 'A' levels – the extent of variation is well illustrated by the fact that whereas Cambridge accepts H grades as equivalent to 'A' levels, Exeter will only accept them in lieu of passes at 'O' level.

All universities will consider O.N.C./D. and H.N.C./D. as entrance qualifications in place of 'A' levels, subject to certain conditions, usually that the average mark should have been 60% in three subjects and that the candidate can provide satisfactory evidence of general education.

All universities in England, Wales and Ireland are prepared to recognise a Grade 1 pass in the Certificate of Secondary Education (C.S.E.) as equivalent to 'O' level for their General Requirements and sometimes for Course Requirements also, but some make the condition that the particular C.S.E. syllabus must be suitable. At the time of writing, universities in Scotland have not recognised C.S.E. as an entrance qualification.

Course Requirements have many variations in detail, but the average requirement for entry to an engineering degree course is 'A' level in Mathematics and Physics. Some universities ask for a third science 'A' level, and Chemistry is often a requirement at 'O' level. In the case of Chemical Engineering, most universities require three 'A' levels of which Chemistry must be one. Similarly for Metallurgy and Materials Science, three science 'A' levels are often required. It is also an advantage to offer three 'A' levels for Chemistry and for Biological subjects, and here the subjects need not always include Mathematics if this has been passed at 'O' level.

Entrance qualifications for C.N.A.A. degrees

Minimum entry requirements for degrees of the Council for National Academic Awards at polytechnics and colleges of technology are much more clearly defined than those of universities. The following information is taken from the 'Compendium of Degree Courses 1971' (which the student should consult) published by the C.N.A.A. (see Section 7, Bibliography):

For colleges in England and Wales, one of the following:

A General Certificate of Education with passes in five subjects, including two appropriate subjects at Advanced level;

A General Certificate of Education with passes in four subjects, including three appropriate subjects at Advanced Level;

An appropriate Ordinary National Certificate or Diploma at a good standard.

Passes at a sufficiently high standard in the Certificate of Secondary Education will be accepted in lieu of passes at Ordinary Level in the General Certificate of Education.

(*The word 'appropriate' in the above entrance requirements means appropriate to the course as designed by the college offering it.*)

For colleges in Scotland:

The Scottish Certificate of Education with passes in five subjects of which three are at the higher grade, or four subjects all at the higher grade, or

An appropriate Ordinary National Certificate or Diploma at a good standard.

Colleges have the discretion to admit in exceptional cases students who do not have the standard entry qualifications but who are regarded as having a qualification of an equivalent standard.

Apart from the standard entry qualifications required by the Council, there are often special admission requirements for a particular course, for example, passes in G.C.E. at 'A' and/or 'O' level in certain subjects. This applies to a number of courses in Science and Technology. Similarly a college may require a pass at a particular level in the Ordinary National Certificate or Ordinary National Diploma examinations.

The C.N.A.A. Compendium gives full details of the special requirements of the colleges for the various courses. Requirements at 'A' level follow the pattern of those for university degrees, i.e. Mathematics and Physics for engineering degrees, or two from Mathematics, Physics and Chemistry for Chemical Engineering or Metallurgy. For Chemistry degrees, 'A' level Chemistry is essential plus either Mathematics or Physics, and for degrees in biological subjects there is a wide choice of science subjects. Although the basic requirement is two 'A' levels, in many cases a third science must have been studied to 'A' level.

Higher National Diploma

As mentioned above, another route to qualification as a professional engineer is by way of the H.N.D. Entry qualifications for this course are five G.C.E. passes including Mathematics and Physics, one of these two having been passed at 'A' level and the other having been studied to the same level. For Metallurgy, the choice of science 'A' levels includes Chemistry. To take an H.N.D. in a science subject, the student would normally offer 'A' level in that subject, e.g. Chemistry, Biology, Physics, or Mathematics, although colleges will consider other subjects.

The H.N.D. is usually taken as a three-year sandwich course, though there are some two-year full-time courses. Holders of the H.N.D. in engineering can, after a further year's study, take the Part 2 examination of the Council of Engineering Institutions, and so qualify as Chartered Engineers (C.Eng.).

A list of colleges offering H.N.D. courses, and those offering College or Polytechnic Diploma courses for H.N.D. graduates which carry exemption from C.E.I. Part 2, will be found in 'A Compendium of Advanced Courses in Technical Colleges' published by the Regional Advisory Council for Technological Education (see Section 7, Bibliography).

Other courses leading to exemption from the C.E.I. Examination

There are a few colleges and polytechnics with full-time or sandwich courses leading to a College or Polytechnic Associateship or Diploma, which are open to school leavers with one 'A' level science, and which give exemption from C.E.I. Part 2. These courses also are listed in the Compendium mentioned in the previous paragraph. It is not, however, recommended that students should qualify in this way if they can obtain a place on a course for a degree or H.N.D.

There is only one course (at the Polytechnic of the South Bank) specifically for C.E.I. Part 1 but if a student is in the position of having to sit this examination his local technical college will usually help him to do so.

Finally, students who take a Higher National Certificate in engineering by day release while working with a firm, can gain exemption from C.E.I. Part 1 if they obtain two Distinctions or three endorsement subjects. But the H.N.C. is primarily a technician qualification, and this concession is only intended for the exceptional case. Anyone with a bare pass in H.N.C. and three endorsements would find it difficult to contend with the C.E.I. Part 2 examination.

Qualifications for Technician Entry

Employers recruit technician apprentices in their immediate area, and send them to local colleges on a day-release (or, increasingly, a block release) basis. They are recruited from school leavers aged 16–17½, and many schoolboys find greater interest in this kind of practical training than they would have done in staying at school to take 'A' levels. There is no need for them to feel that they can never progress beyond technician level, in view of the fact that universities and polytechnics will consider applicants with O.N.C./D. as explained above. A high proportion of polytechnic students are in fact O.N.C./D. people.

O.N.C. and O.N.D. usually take two years, but in some areas firms and colleges are operating a one-year block

release course as a 'safety-net' for students who have spent two years in the Sixth Form but have not quite made the grade for university. If, at the end of the year, they have a mark of 60% in the O.N.C., they can then go on to a degree course. Students who fail their 'A' levels might find it worth while enquiring from firms about this possibility.

Technicians recruited from schools to do O.N.C. or O.N.D. (as distinct from those promoted from Craft Apprentice) are expected to have four 'O' levels, or four Grade 1 passes in C.S.E. Subjects should include Mathematics and an appropriate science. In addition, a subject showing ability to use English is required for courses in Construction, Building, Food Technology, Nautical Science, Surveying, and Textiles, but is not insisted on for Engineering, Mining, Naval Architecture, or Science.

In Scotland, students only require three O grades for O.N.C./D. courses, but these have to be in Physics, Applied Mechanics, and Technical Drawing. Some firms prefer applicants to have O grade in English as well. Candidates are also accepted with O grades in Mathematics, Physics or Applied Mechanics, and two other subjects.

School leavers with less than the specified number of 'O' levels can take a more practical type of course leading to the City and Guilds full technological certificate. This is a Technician course proper, often called a T course, lasting five years. (For more details of Technician courses see Glossary, p. 106.)

There is likely to be considerable change in the structure of technician education if and when the Haslegrave Report is fully implemented (Report of the Committee on Technician Courses and Examinations, D.E.S. 1969). The need for the existence side by side of O.N.C./D. and T courses was questioned by the Committee, which recommended the gradual phasing out of the former, and substitution of a Technician Certificate and Diploma (T.C./D.) and a Higher Technician Certificate and Diploma (H.T.C./D.), with provision for transfer to degree courses at appropriate stages. In November 1970 the Secretary of State for Education and Science accepted in principle the main administrative recommendations in the report. Since then discussions have been going on with a view to establishing the new Technician Education Council which the report recommended and when this comes into existence it will consider the future pattern of courses for technicians.

Students will be advised about courses by their employers, but they can also ask for information from the nearest Regional Advisory Council for Further Education (see addresses on p. 101) and can consult the Cornmarket Press publication 'A Directory of Further Education' which contains a list of full-time and part-time courses (see Section 7, Bibliography).

APPLICATIONS TO FIRMS

University candidates

Early application is essential, whether for full-time courses or for thin sandwich courses at the technological universities. It should be noted that a few firms require their scholarship applicants to apply very early indeed; for instance, the Automotive Products Group (Section 3) ask for applications for its Oxford scholarship two years in advance of university entry, and British Petroleum prefer applications 'at least one year before sitting 'A' level examinations'.

In general, however, it is sufficient for the student to apply at the same time as he puts in his U.C.C.A. application, i.e. early in the autumn term.

Full details of the synchronisation of the U.C.C.A. programme with firms' selection procedures are given in the pamphlet 'Industrial Awards and the Universities Central Admissions Scheme' obtainable free of charge from U.C.C.A., P.O. Box 28, Cheltenham, GL50 1HY. The following paragraphs summarise the information contained in it.

The candidate will apply to industrial firms about October and may expect to be informed by the firm if he has been given a place in the spring of the following year – usually conditional on his obtaining a place at university. He should know, before submitting his U.C.C.A. application, whether the awards he is applying for are tenable only at certain universities. (If this information is not given in Sections 1 or 3 of this brochure, he should first make sure from the firm whether any such special arrangement exists.)

If he finds that he must apply to a college he has not named in his U.C.C.A. selection, he must immediately write to U.C.C.A. to ask for an amendment to his application. Provided this is done before the end of March he will be allowed to substitute the new choice and also retain *one* of his existing choices. If he leaves it until after the end of March, an application in the September Clearing scheme will be necessary, and he should write at once to U.C.C.A. for advice as to what he should do.

The applicant for a 1:3:1 course (who will be spending a preliminary year in industry) must decide whether to apply for a university place for two years ahead, or to apply for the following October and then ask the university to defer his place for a year, if he obtains an industrial place. For reasons explained in the U.C.C.A. leaflet the latter procedure may be best; and to enable universities to fill any resulting vacancies within the framework of the U.C.C.A. timetable, firms have been asked to select such candidates by 15th March.

Candidates who receive such 'first-round' offers must obtain at least a conditional offer from a university by 1st June or the firm's offer may be withdrawn, and the place

given to someone on the reserve list who has a conditional university offer. In August the university notifies U.C.C.A. which candidates holding conditional offers are acceptable and which are not, and also which candidates on their reserve list are acceptable. Industrial vacancies caused by failure to obtain a university place can then be filled from the remaining acceptable candidates.

The procedure for those applying for thin sandwich courses is very similar. If a candidate wants to include such a course at a technological university among his other choices when completing his U.C.C.A. form, he should first consult firms and the appropriate university, and then enter it as one of his choices.

If he comes to a *definite agreement* with a firm to sponsor him and send him to a particular university, he must name that university only on his form.

The U.C.C.A. form must not be used by candidates already employed in industry who are applying to one of the technological universities. Such candidates and their employers must make arrangements direct with the university concerned. This, however, does not affect school leaver entrants. It concerns in the main those who joined the firm at a younger age and qualified for a degree course through the O.N.C.

Applicants for C.N.A.A. degrees

Applicants for sandwich courses leading to the degrees of the Council for National Academic Awards at polytechnics and colleges of technology should apply direct to the firm and the college, if they wish to be sponsored. (In a few cases the firm will arrange the college place.) Those wishing to be college-based apply to the college only. There is no central U.C.C.A. type of scheme for polytechnic or college places at present. The time factor is not quite so vital for these courses, and Section 1 of this brochure gives some idea of firms' closing dates. It is advisable, in general, to start making enquiries in the Autumn term, as there is considerable pressure on some courses.

1 Employers offering Studentships and Technician Training in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Aiton & Co. Ltd, Head Office and Works: Stores Road, Derby Part of the Whessoe Group (Applications to: The Personnel Manager)	Specialised pipework and ancillary equipment for power stations, ships and Industry, also evaporator distillers and process plant, including mixers	Mechanical Chemical Eng.	*16–18* *'O' level* Day release for O.N.C., proceeding to thin sandwich course for degree *'A' level* Thin or thick sandwich course for degree, at college of student's choice; some preference for Nottingham Polytechnic	G Sch Intake variable
Alcan Booth Industries Ltd, 1 Mount Street, Berkeley Square, London W1Y 6HP (Applications to: The Personnel Officer) *Works at:* Banbury, Birmingham, Rogerstone (Mon.), Skelmersdale Subsidiaries in most areas	Wrought aluminium; conversion of aluminium ingots into sheet, plate, sections, tube, castings, forgings and paste. Subsidiary companies produce industrial and consumer goods in many markets	Metallurgy Mechanical Production	*17–20 'A' level* For Metallurgists, day release for H.N.C. with possibility of selection for degree sandwich course. Student Engineers go straight on sandwich course for degree or H.N.D. with own choice of college, but no 1:3:1 students. In both branches it is possible to transfer to the Graduate Training Course after qualification	G Sch
W. H. Allen, Sons & Co. Ltd, Bedford (Applications to: The Training Manager) *Also at:* Atlas Works, Pershore, Worcs. (Apply to Bedford in each case)	Diesel engines, steam and gas turbines, pumps, gearing	Mechanical Production	*16–17 'O' level* Block release for O.N.C. course *18–19 'A' level* Take suitable day release course during first year as 'lead-in' to university studies. Both 1:3:1 and thin sandwich courses. Own choice of university, but for thin sandwich students the Company has special arrangements with Bath, Brunel, City, Aston, Salford, and Loughborough Universities	G P Applications by 31st March ('O' level), 28th Feb. ('A' level) of relevant year. Form on application. 6–8 p.a.
Allen West-EAC Ltd, Brighton BN2 4QE (Applications to Chief Training Officer)	Electrical motor control gear for all aspects of industry, electrical traction and marine service	Electrical Mechanical Industrial Production	*16–17½ Technical Apprenticeship* Four or five-year indentured course with day or block release for O.N.D. and either H.N.C. or H.N.D.	Sch

(*Continued on page 2*)

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Allen West-EAC Ltd – *continued*			*18–19½ Student Apprenticeship* Sandwich course in electrical or mechanical engineering leading to honours B.Sc. (Eng.) at Brighton Polytechnic	2 p.a.
The A.P.V. Co. Ltd, Head Office and Works: Manor Royal, Crawley, Sussex *Subsidiary companies at* Croydon, Thetford, Greenhithe, E. Kilbride, Carlisle, Thornton Heath, Pulborough, Blackpool (Applications to: Group Training Officer)	Specialised process plant and heat transfer equipment. Fabricators and founders	Mechanical Chemical Eng. Metallurgy Electrical Chemistry	*16–18 Technician Apprenticeship* Day release for O.N.C. and H.N.C., or may transfer to H.N.D. or degree *18–19 Student Engineer Apprenticeship* Degree course, usually thick sandwich, either 1:3:1 at university or 2:1:1 course for C.N.A.A. degree. Six-year Apprenticeship	Applications by April each year P G Sch 40–60 p.a.
Andrews-Weatherfoil Ltd, 185 Bath Road, Slough, Bucks. (Applications to: The Training Officer)	Design and installation of heating, ventilating and air conditioning systems and other mechanical services for all types of buildings and industrial premises	Initially Mechanical, then Environmental	*Up to 18 Senior Technician Apprenticeship: 'O' level* Day release for O.N.C. in Engineering then two-year thin sandwich diploma course in Environmental Engineering at the Polytechnic of the South Bank	G H (Diploma course periods only) About 6 p.a. Applications preferred by end April
Ashton Bros. & Co. Ltd, P.O. Box 19, Carrfield Mills, Newton Street, Hyde, Cheshire SK14 4NR Branch of Courtaulds Northern Textiles Ltd (Applications to: Personnel Manager)	Textiles, yarns and fabrics for all household, dress and industrial purposes	Textile Technology	*Up to 18 'O' level* Day release for study at Salford College of Technology for Associateship of the Textile Institute.	G For scholarships see section 3, Textile Institute
Automotive Products Group (Lockheed Hydraulic Brake Co. Ltd, and Associated Companies), Tachbrook Road, Leamington Spa (Applications to: Group Education Officer)	Light engineering products mainly for the automobile and aircraft industries. Brakes, clutches, filters, steering joints, automatic transmissions, self-sealing couplings, aircraft undercarriages and hydraulic systems, industrial hydraulics	Production Mechanical Automotive	*About 18 University entry level* Thick or thin sandwich course leading to degree: Prod. and Mech. Eng. often at University of Aston: Mech. Eng. at Lanchester Polytechnic (Coventry or Rugby); Automotive Eng. at Loughborough University; but students may opt for other colleges – see section 3 *About 18 'A' level Maths. or Physics* Student apprenticeship with block release for second year of O.N C. Can then go on to H.N.C. or transfer to degree course according to level attained	G P H Sch (see section 3) Closing dates for applications (a) Sandwich Scholarships 15th February (b) Student Apprenticeships Application may be made at any time but preferably as early as possible in the year of entry

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
W. & T. Avery Ltd, Soho Foundry, Birmingham 40 (Applications to: The Training Officer)	Weighing, counting and testing machines	Mechanical Production Chemistry Metallurgy	(a) *17 'O' level* Day and block release for O.N.C. and H.N.C. in Mech. or Prod. Eng. (b) *17 'O' level* Day release for H.N.C. in Chemistry or Metallurgy, followed by Grad. R.I.C. or L.I.M. (c) *17–19 'A' level* Four-year thin sandwich degree course in Mech. or Prod. Eng. at University of Aston in Birmingham (d) *18–19 'A' level in Maths. or Phys. (both studied to 'A' level)* Three-year sandwich course for H.N.D. in Mech. or Prod. Eng. at local technical colleges	(a) 10 p.a. (b) 1 p.a. (c) 2 p.a. (d) 8 p.a. G Sch Applications by July
Birmid Qualcast (Foundries) Ltd, Dartmouth Road, Smethwick, Warley, Worcs. (Applications to: Divisional Training Officer) *Associated companies operating the scheme include:* Birmidal Developments Ltd Birmingham Aluminium Casting (1903) Co. Ltd Coneygre Foundry Ltd Dartmouth Auto Castings Ltd Midland Motor Cylinder Co. Ltd Perry Barr Metal Co. Ltd Sterling Metals Ltd Trucast Ltd Qualcast Ltd	Ferrous and non-ferrous castings of all types	Mechanical Production Metallurgy Foundry Technology Electrical	*16–20 'O' level upwards* Day release for O.N.C. Sandwich course for H.N.D. or degree. Students usually attend Loughborough University	G Sch
Bovis Ltd, Liscartan House, 127 Sloane Street, London SW1X 9BA	Building, civil engineering, property, housing	Management in Building, Civil, Structural and Mechanical Engineering	*18–21 'A' levels (a few accepted with four 'O' levels)* Day release for O.N.C. and H.N.C. or sandwich study for H.N.D. or degree. Most trainees follow courses leading to qualifications in Building, but a few vacancies exist each year for trainees in Engineering	G About 16 trainees p.a.
BP Chemicals International Ltd, Stratton House, Stratton Street, London W1X 6LS (Application to: Staff Manager) Locations at Epsom, Sunbury, Hull, Grangemouth, Baglan Bay, Barry	Organic chemicals and Plastics	Mechanical Electrical Control Chemical Eng. Chemistry Applied Physics Applied Maths.	*17–19 'A' level for Engineering course* Sponsored sandwich course for degree at university or polytechnic of student's choice *17–23 'A' level for Science course* Day release for Grad.R.I.C., H.N.C. or Grad.Inst.P.	G P 15 p.a. Sch (see section 3) About 40 p.a.

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Brico Engineering Ltd, Coventry (Applications to: Apprentice Supervisor) *Also at* Lydney (Glos.)	Piston, piston rings, cylinder liners, valve guide, valve seat inserts, tappets, swirl chambers, drill bushes	Mechanical Production Metallurgy	*16–17 'O' level* Day release for O.N.C. and H.N.C. *17–18 'A' (one or two)* Start on day release; sandwich course for degree may be offered on recommendation by college. There is also a three-year H.N.D. sandwich course in Metallurgy leading to A.I.M. Most students attend Lanchester Polytechnic	G Applications should be made by Easter if possible
British Aircraft Corporation Ltd *Enquiries to:* Manager, Group Education and Training Services, Brooklands Road, Weybridge, Surrey *Applications* should be sent to the Training Manager at one of the following divisions: British Aircraft Corporation Commercial Aircraft Division, Filton House, Bristol. British Aircraft Corporation, Preston Division, Warton Aerodrome, Nr. Preston, Lancs. British Aircraft Corporation, Commercial Aircraft Division, Weybridge, Surrey British Aircraft Corporation, Guided Weapons Division, Six Hills Way, Stevenage, Herts. *Also at* Filton House, Bristol	Aircraft, guided missiles, electronics, space satellites	Aeronautical Mechanical Electrical Electronics Production Mathematics Physics	*16–17½ Technician Apprenticeship* Part-time day or block release for O.N.C. Further education to H.N.C., H.N.D. or degree depending on results. (Those with fewer than four 'O' levels but with C.S.E. passes take the City and Guilds Technological Certificate) *17–19 Undergraduate Apprenticeship* 1:3:1 and thin sandwich schemes for university degree. (Applicants must have a place at university to read an engineering science; there is a particular need for those taking thin sandwich courses)	G P Sch H (Bristol only) Potential undergraduate apprentices should apply before 28th Feb. Preference given to those applying before Christmas. Apprentices can be transferred from one category to another if their progress warrants this.
The British Broadcasting Corporation, Engineering Departments, Broadcasting House, London W1A 1AA (Applications to: The Engineering Recruitment Officer) *Engineering Training Centre* is at Evesham, Worcestershire *Practical training* may take place at studio centres or transmitting stations in any part of the country		Electronics Radio Telecommunications (sound and television)	*18, for Technical Traineeships* Four-year sandwich course leading to C.N.A.A. honours degree in telecommunications engineering (usually read at Plymouth Polytechnic) *18, for Technical Assistants* ('O' level, but must have studied Maths. or Physics to 'A' level.) Initial training comprises a three months' full-time residential course at the Engineering Training Centre, followed by several months' practical training on the job. After gaining experience, Technical Assistants may take further courses to enable them to qualify as Engineers *18, for Technical Operators* *'O' level* During first year, Technical Operators attend a three-month full-time residential course at the Engineering Training Centre, followed by several months' practical training on the job. After gaining experience, they may (*Continued on page 5*)	P (one year's pre-university industrial course for those reading electrical engineering, electronics or Physics) G (two-year traineeship in Research and Design Dept. or direct appointment to Engineering Dept.) H (only at the Engineering Training Centre) 6 Technical Trainees p.a. and 50–100 in other two categories Applicants must

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
The British Broadcasting Corporation – *continued*			apply to take a further course to qualify them for more senior appointments	have keen interest in some aspect of radio or television. Normal colour vision is essential
British European Airways, Bealine House, Ruislip, Middlesex (Applications to: Personnel Officer (Apprentices), BEA Engineering Base, Heathrow Airport – London, Hounslow, Middlesex)	Civil Aviation	Air Transport Engineering	*17½–20 'A' level* Four-year integrated sandwich course between BEA Engineering Base and City University, London, for degree in Air Transport Engineering	Applications not later than March 31st Applicants must have obtained a provisional place at the City University Sch (full pay plus other allowances throughout course) G Normally 5 p.a.
British India Steam Navigation Co. Ltd, P & O Building, Leadenhall Street, London EC3 (Applications to: Personnel Department)		Marine (sea-going)	*16–18 'O' Maths., English, Physics or other Science, and one other* Two-year O.N.D. course in Mech. Eng., or Marine Engineering Technician's Certificate course (depending on suitability of 'O' levels) at a technical college. One year at sea as Engineer Cadet. Final year at a technical college studying for endorsements to O.N.D. or Marine Engineering Technician's Certificate. Should be qualified at end of training for exemption from Part A of examinations for Second Class and, in some cases, First Class Department of Trade and Industry Certificates of Competency for Engineer Officers	H Applications in March or April
British Insulated Callender's Cables Ltd, Central Research and Engineering Division, 38 Wood Lane, London W12 (Applications to: Administration Manager)	All types of cables used in heavy and light current transmission and all ancillary equipment; railway traction: capacitors; copper forgings, rods, sections and sheet; steel structures for power transmission, radio and television	Chemistry Physics Metallurgy Electronics Mathematics	*17 Technician Apprenticeships* Day release for approved courses of study, usually O.N.C. Good results can lead to transfer to degree or diploma course *17–18 Student Science Apprenticeship* Thin and thick sandwich degree courses at university or polytechnic	6–10 p.a. G P Sch
British Leather Manufacturers' Research Association, Milton Park, Egham, Surrey	Research work in chemical, physical and biological fields related to the leather industry	Chemistry Physics Biology	*16 upwards, minimum two 'O' levels* Day release to improve G.C.E. qualifications, then O.N.C. and H.N.C., B.Sc. (Ext.) of London	5 p.a. P Sch

(*Continued on page 6*)

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
British Leather Manufacturers' Research Association – *continued* (Applications to: The Director)			University, Grad.R.I.C. or membership of the Inst. of Physics. Sandwich degree courses sometimes supported	
BRITISH LEYLAND MOTOR CORPORATION Applications should be sent to the *Training Department* of the Division or Plant in which the Student is interested; see below.	More details of products and training schemes will be found in the brochure 'Opportunities for School Leavers' obtainable from British Leyland Central Training, 309 Tyburn Road, Birmingham 24	All Divisions follow this general pattern but there are variations to suit the particular needs of product, locality and size of plant	*Under 18, four 'O' levels, Technician Apprentices* Day or block release for O.N.C. and H.N.C. or City and Guilds Certificates *Under 20 'A' level Engineering Student (Technologist)* Thin and 1:3:1 Sandwich courses for degrees at polytechnics, universities and colleges of technology; thin sandwich courses for H.N.D.	G P H in some Divisions; training staff help find lodgings in others Sch (see section 3)
1 AUSTIN MORRIS AND MANUFACTURING GROUP **British Leyland (Austin Morris) Ltd,** Longbridge, Birmingham 31	Cars, transmissions, engines, medium and light vans, carburettors, suspension units, axles, gearboxes, pressings, press tools, jigs, etc	Mechanical Production Automobile Metallurgy Computer Sciences Foundry Technology	Technician and Technologist	
British Leyland (Austin Morris) Ltd, Service Division, Cowley, Oxford			Technician only	
Power and Transmission Division **British Leyland (Austin Morris) Ltd,** Longbridge, Birmingham 31		Mechanical Production Automobile Electrical Electronics Computer Science	Technician and Technologist	
British Leyland (Austin Morris) Ltd, Transmissions Division, Drews Lane, Ward End, Birmingham 8		Mechanical Production Metallurgy Computer Science Industrial	Technician and Technologist	
Pressed Steel Fisher Ltd, Common Lane, Birmingham 8			Technician only	
British Leyland (Austin Morris) Ltd, Coventry Engine Plant, P.O. Box 20, Bell Green Road, Coventry CV6 7GN		Mechanical Production	Technician and Technologist	

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
BRITISH LEYLAND MOTOR CORPORATION – *continued* *Body and Assembly Division* **Pressed Steel Fisher Ltd,** Cowley, Oxford OX4 5NL		Automobile Production Mechanical Electrical Electronic Chemical Eng. Metallurgy ComputerScience Industrial Eng.	Technician and Technologist	
British Leyland (Austin Morris) Ltd, MG Division, Abingdon, Berks		Industrial (Work Study etc)	Technician and Technologist	1 or 2 p.a.
Pressed Steel Fisher Ltd, Stratton St Margaret, Swindon, Wilts.		Mechanical Production	Technician only	
Pressed Steel Fisher Ltd, P.O. Box 268, Albion Works, Kingsbury Road, Birmingham 24		Mechanical Production	Technician and Technologist	
British Leyland (Austin Morris) Ltd, Radiator Operations, Woodstock Road, Oxford OX2 7PB		Mechanical Production	Technician and Technologist	
Pressed Steel Fisher Ltd, Llethri Road, Felinfoel, Llanelli. Carms.		Mechanical Production Electrical	Technician and Technologist	
2 SPECIALIST CAR DIVISION **Alvis Ltd,** Holyhead Road, Coventry	Prestige cars – Jaguar, Daimler, Rover, Triumph; Coventry Climax engines; military vehicles, helicopter engines, automatic gearboxes, press dies, etc	Mechanical Production	Technician only, but may qualify for sandwich diploma or degree course during training	
Rover Co. Ltd, Meteor Works, Lode Lane, Solihull, Warwickshire		Mechanical Production Automobile Electrical Metallurgy	Technician only, but may qualify for sandwich diploma or degree course during training	
Jaguar Cars Ltd, Daimler Works, Radford, Coventry CV5 9DR (Applications for Coventry Climax to be sent to Jaguar)		Mechanical Production Automobile	Technician and Technologist	
Triumph Motor Co. Ltd, Canley, Coventry CV4 9DB		Mechanical Production Automobile Metallurgy Chemistry	Technician and Technologist	

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
BRITISH LEYLAND MOTOR CORPORATION – *continued*				
3 TRUCK AND BUS DIVISION **A.E.C. Ltd,** Windmill Lane, Southall, Middlesex	Commercial vehicles, buses, coaches, tractors, military vehicles, bus and coach bodywork, petrol, diesel and gas turbine power units, gearboxes, axles, heavy duty electrical equipment, vehicles spares, etc	Production Mechanical	Technician only, but may qualify for sandwich diploma or degree course during training	
Albion Motors, Ltd, South Street, Scotstoun, Glasgow W4		Mechanical Production	Technician and Technologist	
Bristol Commercial Vehicles Ltd, Bath Road, Brislington, Bristol 4			Technician only	
Eastern Coach Works Ltd, Eastern Way, Lowestoft		Production	Technician only, but may qualify for sandwich diploma or degree course during training	
Guy Motors Ltd, Fallings Park, Wolverhampton			Technician only	
Leyland Motors, Leyland, Preston PR5 1SN		Mechanical Production Automobile	Technician and Technologist	
Leyland Motors (Scotland), Blackburn Road, Bathgate, West Lothian		Mechanical Production Automobile Metallurgy Chemistry Computer Science	Technician and Technologist	About 15 p.a.
Maudslay Motor Co. Ltd, Castle Maudslay, Alcester, Warwickshire		Mechanical Production	Technician and Technologist	
4 SPECIAL PRODUCTS DIVISION **Alford & Alder (Engineers) Ltd,** Maylands Avenue, Hemel Hempstead, Herts.	Road rollers, motor graders, tractor shovels, dump trucks, concrete mixers, hoists, quarry plant, stone crushers, mixers, electric motors, construction work, commercial vehicles, trailers, die castings, cylinder blocks and heads, axles, steering gear, airfield tenders,		Technician only	
Aveling-Barford Ltd, Invicta Works, Grantham, Lincs.		Mechanical Production Electrical (occasionally)	Technician and Technologist	
Beans Industries Ltd, Hurst Lane, Tipton, Staffs.			Technician only	

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Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
BRITISH LEYLAND MOTOR CORPORATION – *continued* **Rearsby Automotive Ltd,** Rearsby, Leicester	car components, etc		Technician only	
Scammell Lorries Ltd, Tolpitts Road, Watford, Herts.		Automobile Mechanical	Technician and Technologist	
Transport Equipment (Thornycroft) Ltd, Worthing Road, Basingstoke, Hants.			Technician only	
Wellingborough Foundry, Wellingborough, Northants.		Foundry Technology	Technician and Technologist	
West Yorkshire Foundries Ltd, Sayner Lane, Leeds LS1 1QX			Technician only	
5 PRESTCOLD DIVISION **Prestcold Ltd,** Station Road, Theale, Berks.	Industrial refrigeration; an extensive range of refrigeration compressors, condensing units and cooling equipment for world markets	Mechanical Production	Technician and Technologist	
The British Non-Ferrous Metals Research Association, Euston Street, London NW1 2EU	Research for the non-ferrous metals industry	Metallurgy	*16–17 'O' level* Day release for O.N.C. and H.N.C. followed by L.I.M., A.I.M. *18–19 'A' level* Day release for H.N.C. followed by L.I.M., A.I.M. Students occasionally go on sandwich courses, but most are part-time at City of London Polytechnic	About 10 p.a. G
British Overseas Airways Corporation, P.O. Box 10, Hounslow, Middlesex (Applications to: Manager Selection Services)	Civil Aviation	Electrical, Electronic and Mechanical relating to aircraft maintenance Air Transport or Electrical and Electronic	*Between 16 and 17 on 1st September in year of entry* *'O' level or good C.S.E.* Block release leading to O.N.C. thence to H.N.D., or B.Sc. in Air Transport Engineering *Between 17½ and 19½ on 1st September in year of entry. 'A' level* Integrated sandwich course at City University for B.Sc. honours degree	For 'O' level entry applications accepted in anticipation of results Applicants must have provisional acceptance by City University; final decision only after 'A' level results published in August H Sch (full pay plus other allowances throughout course) Closing date 31st March for both entries

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
The British Petroleum Co. Ltd, Britannic House, Moor Lane, London EC2Y 9BU (Applications to: Manager, External Recruitment) Practical training in head office departments or refineries in England, Scotland, Wales and N. Ireland or other company centres	Petroleum and petro-chemicals	Chemical Eng. Mechanical	*Not more than 19: 'A' level Full-time Apprenticeships* Full-time degree courses, usually at one of the following universities: Birmingham, Manchester, Swansea, Edinburgh, Oxford, Warwick, Cambridge (Mech. Eng.) *Sandwich Course Apprenticeships* Sandwich courses for degrees in Chemical Engineering at Glamorgan College of Technology, and in Mechanical Engineering at Thames Polytechnic	G Sch (see section 3) Application for full-time apprenticeship should be made before approaching U.C.C.A. and at least one year before taking 'A' level Application for sandwich course by December in final school year
		Chemistry Physics Mathematics and related subjects	*Full-time Apprenticeships* Full-time degree course in Chemistry, Physics, Mathematics or related subjects, usually at one of the following universities: Belfast, Birmingham, Edinburgh, Kent, Manchester, Oxford, Swansea, Warwick *Sandwich Course Apprenticeships* Sandwich course for degrees in Chemistry at Kingston College of Technology or Northern Polytechnic	
British Rail (a) *For B.R. Scholarships* Principal Management Recruitment Officer, Royal London House, 22/25 Finsbury Square, London EC2P 2BQ (b) For Sponsored Thin Sandwich Courses and *entry at 'O' level* General Manager, British Rail, Eastern Region, York Scottish Region, Buchanan House, 58 Port Dundas Road, Glasgow C4 London Midland Region, Euston House, Eversholt Street, London NW1 Western Region, Paddington Station, London W2 Southern Region, Waterloo Station, London SE1 British Rail Engineering Ltd, B.R. Technical Centre, London Road, Derby		Civil Mechanical and Electrical (heavy Current) Signal and Telecommunications (Light Current Electrical) Electronic and Production Engineering	(a) *16–17 Technician* Day release for O.N.C. and H.N.C. (b) *17–20 'A' level* Scholarships and sponsorships for full-time and thin sandwich degree courses at universities, polytechnics and regional colleges	(a) About 10 Civil, 10 Mechanical and Electrical (heavy current), 10 Electrical (light current) or Electronics (b) 20 p.a. Closing date for scholarship applications 30th November G P

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
British Steel Corporation, General Steels Division, Teesside & Workington Group *Training* within Works of the Group (Applications to: Training Development and Administration Officer (Group) P.O. Box 11, British Steel Corporation, Middlesbrough, Teesside)	Iron and steel manufacture	Mechanical Electrical Civil Chemistry Metallurgy Physics Fuel Technology Mathematics	*17–19 'A' level* Thin and 1:3:1 sandwich degree courses, with own choice of college or university	G P Sch About 6 p.a.
British Steel Corporation, General Steels Division, Teesside and Workington Group, Consett Works, Consett, Co. Durham	Iron and steel slabs, plates, blooms, billets, sections, angles, rounds, refractories	Chemistry Metallurgy	*16–18 'O' level Technical trainee* Day release for H.N.C. (Chemistry or Metallurgy) and L.I.M. or Grad. R.I.C. Possibility of transfer to sandwich course for outstanding trainees	12 p.a.
British Steel Corporation, Special Steels Division, The Mount, Broomhill, Sheffield S10 2PZ (Applications to: Senior Education and Training Officer) *Works at* Sheffield, Cumberland, Scotland, Wales and Birmingham	Alloy and special steels	Mechanical Electrical Metallurgy	*17–18 'A' level* Thick and thin sandwich degree courses, with free choice of college or university	Sch P 10–15 p.a.
British Steel Corporation, Tubes Division, Corby, Northamptonshire *Also at:* Coombs Wood Works, Halesowen, Nr Birmingham Stanton & Staveley, P.O. Box 72, Nr. Nottingham NG2 5AA Tollcross Works, Tollcross, Glasgow (Applications to: Divisional Training Office, British Steel Corporation, Tubes Division, Corby, Northamptonshire)	Iron, steel, concrete and plastic tubes	Mechanical Electrical Production Chemistry Metallurgy Fuel Technology Instrument Technology	*16 upwards 'O' level, Technical Apprenticeship* Technical apprenticeships are offered in the branches named and also in Foundry Technology, Industrial Radiology, Technical Estimating and Draughtsmanship. Day or block release for appropriate courses, usually O.N.C. and H.N.C. May be promoted to H.N.D. sandwich course followed by study for professional qualifications *18 upwards 'A' level, Student Apprenticeship* Thin or 1:3:1 sandwich courses for degrees at universities or colleges of students' own choice	Closing date for technicians: England – 31st July for September intake: Scotland 31st March for July intake P G Sch H – Corby only About 15 p.a. Closing date for Students: England – 31st March for September intake; Scotland 31st March for July intake

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
British Timken Division of the Timken Company, Duston, Northampton (Applications to: Education Manager) *Works at* Duston and Daventry	Tapered roller bearings	Mechanical Production	*16–17 'O' level Technician* Block release for O.N.C. and H.N.C. *18–19 'A' level Student Apprentice* Thin sandwich course leading to honours degree at university or polytechnic	 G P Sch
British United Shoe Machinery Co. Ltd, Leicester (Applications to: Personnel Manager)	A large range of machinery of a high standard of precision used mainly in the boot and shoe industry	Mechanical Production	*16–17 Technician Apprenticeships* Day or block release for O.N.C. and H.N.C. *18 Student Apprenticeship* Thin sandwich course for H.N.D. or degree at college of student's choice. No 1:3:1 courses	G Sch Closing date end April 1 or 2 p.a.
The David Brown Group of Companies, Huddersfield, Meltham (Yorks.), Sunderland, Penistone, Salford, Leigh, Southampton, Portsmouth, Newport Pagnell, Wokingham, Cheltenham (Applications to: Manager, Training and Management Development, David Brown Corporation (Central Staff) Ltd, 'Durker Roods', Meltham, Huddersfield HD7 3AG	Gears, gear units, steel and bronze castings, agricultural tractors, high speed marine craft, automobiles, industrial electronic heating equipment, honing equipment	Mechanical Marine Electrical	*19 'A' level* Thin sandwich courses for degrees at technological universities (Salford, Bradford and Loughborough preferred). A few 1:3:1 students accepted	G P Sch Applications should be submitted as early as possible in the final school year. No fixed number of vacancies
John Brown Engineering (Clydebank) Ltd, Clydebank, Scotland (Applications to: Personnel Manager)	Industrial gas turbines, marine gas and steam turbines	Marine and general	*School-leavers, Scottish Higher Leaving Certificate or equivalent in England* Evening classes for H.N.C.; may transfer to degree or diploma course if suitable *School-leavers: University entrance standard* Thin sandwich course at Glasgow University for degree, or at University of Strathclyde, or full-time degree course at Cambridge with pre-university year and vacation training	2 p.a. G (5 p.a.) P
Brush Electrical Engineering Co. Ltd, Loughborough, Leics. LE11 1EZ A Hawker Siddeley Company (Applications to: Education and Training Officer)	Rotating electrical machines, control gear, switchgear, transformers, complete electric power plants	Power Electrical Industrial Electronics Mechanical Production	*16–17 'O' level* Day release for O.N.C., H.N.C. and Technicians' courses *17–19 'A' level* Thin sandwich scheme for degree or H.N.D. at technological university or polytechnic of student's choice	 Sch Applications should preferably be in by end of April About 20 p.a.

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Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of courses	Notes (see p. 54) and approx. no. of vacancies p.a.
C. Bryant & Son Ltd, Whitmore Road, Birmingham B10 0NT (Applications to: Personnel Manager)	Building and Civil Engineering work	Building Civil Engineering	*16–18 'O' level (one 'A' preferred)* Articled pupilship with day release for O.N.C. and H.N.C. in Building, followed by the Associateship of the Inst. of Building; or Engineering Assistants who follow day release courses for O.N.C. and H.N.C. in Civil Engineering	G
Cadbury Schweppes Ltd, Bournville, Birmingham (Applications to: Personnel Manager) *Also:* J. S. Fry & Sons Ltd, Keynsham, Bristol	Cocoa, chocolate, confectionery, soft drinks, wines and food products	Mechanical Chemistry Food Technology	*17–19 'A' level (3 preferred)* Full-time study or sandwich course for degree or H.N.D. or day release for H.N.C. Trainee chemists normally study by day release for Ext. B.Sc., H.N.C., or Grad. R.I.C.	Sch (see section 3) 2–3 p.a. G P
Cambridge Scientific Instruments Ltd, Chesterton Road, Cambridge (Applications to: Training Officer) The Medical and Scientific Division of Kent Instruments Ltd, Luton	Scientific and medical instruments	Electronics Physics Mechanical Production	*Under 18 Trainee Instrument Technician* Four-year course with day release for O.N.C. or City and Guilds courses. *Note:* Those wishing to specialise in draughting procedures should have Technical Drawing *17½ upwards Student Engineers* Three to four-year thin sandwich course in Applied Physics, Electrical or Mech. Eng. for H.N.D. or B.Sc. Both can lead to membership of professional Institutes. For Electronics and Applied Physics, Company prefers City University and Portsmouth Polytechnic; for Electronics and Mechanical Engineering, Hatfield or Glamorgan Polytechnic	 G Sch No 1:3:1 students sponsored
C.A.V. Ltd, P.O. Box 36, Warple Way, Acton, London W3 *and* C.A.V. Ltd, The Esplanade, Rochester, Kent A member of the Joseph Lucas Organisation (Applications to: The Company Training Manager)	Light engineering products including electrical and fuel injection equipment for vehicles, marine, agricultural and stationary engines	Diesel Mechanical Electrical Production Physics Metallurgy	*16–17 'O' level* Day release for O.N.C. and H.N.C. with possibility of upgrading on attaining good O.N.C., to H.N.D. or degree *17–19 'A' level* Sandwich course for B.Tech. at technological universities, or B.Sc. or H.N.D. at polytechnics. Some 1:3:1 sponsorships also	G Sch P (as part of thick sandwich) 10–12 p.a.
Chance Bros. Ltd, Glassworks, Smethwick 40 A member of the Pilkington Group	Glass	Mechanical Production Chemistry Physics Glass Technology	*16 upwards 'O' level* Day release for O.N.C. and H.N.C. *'A' level* Would consider applications for sandwich courses	2 p.a.

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1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Chrysler United Kingdom Ltd, P.O. Box 46, London Road, Ryton-on-Dunsmore, Coventry CV8 3DZ (Applications to: Training Manager) *Major manufacturing plants:* in Coventry, Luton, Dunstable, Maidstone and Linwood (Scotland)	Cars and commerical vehicles – Hillman, Humber, Sunbeam, Commer, Karrier and Dodge; diesel engines, air conditioning equipment, plastic and metal die castings	Automobile Design Production Automobile Service Metallurgy Chemistry	*Under 18½ on 1st September – Technical Apprenticeship* *'O' level, or if over 18, one 'A' level* Day release, block release or sandwich course for O.N.C. or H.N.C. or other appropriate qualifications *Over 18 and under 19½ on 1st September – Student Apprenticeship* Four-year thin sandwich course leading to degree or H.N.D. in Mechanical or Production Eng., Chemistry or Metallurgy. Preferred colleges are University of Aston in Birmingham, Loughborough University and Lanchester Polytechnic	G Sch Closing date end February
Cincinnati Milacron Ltd, Dells Lane, Biggleswade, Beds	Machine tools	Mechanical Electrical Hydraulic Production Electronic	*16–17 Engineering Apprentice – 'O' level* Day release for O.N.C. and H.N.C. in Mechanical Eng. *18–19 Student Apprentice – 'A' level* Sandwich course at a technological university. (Special arrangement with Brunel but others equally acceptable.) All entrants do a year's pre-university training	P Sch G (2 year)
J. & P. Coats Ltd, 155 St Vincent Street, Glasgow C2 (Applications to: Personnel Officer (Staff) *Also at* Paisley, Scotland	Sewing thread	Textile Technology Chemistry Physics	*16–18 'O' level* Day or block release for O.N.C. and H.N.C. in science or A.T.I.	2–3 p.a. G
Courtaulds Ltd, Group Management Careers Department, Foleshill Road, Coventry CV6 5AE (Applications to: The Senior Education & Training Officer) The Courtaulds Group now comprises some 350 companies operating throughout the UK. Main areas for apprenticeship training are Coventry, Manchester, Nottingham, Derby and Leicester	Man-made fibres, textiles, chemicals, woodpulp, packaging, paint, plastics, engineering, design and construction of buildings, plant and services; manufacture of textile machinery	Chemical Eng. Civil/Structural Electrical (Power Electrical Eng. and Electronics) Instrument and Control Mechanical Mathematics Textile Technology	*17–19 'A' level* 1:3:1 or thin sandwich degree course at university or polytechnic. Student normally has free choice of college, but those applying for Civil Engineering must take degree course which has Structures as principal subject; and those interested in Textile Technology should be taking courses at Bradford, Leeds or Manchester University, or Leicester or Huddersfield Polytechnic	G P Sch (both full and supplementary) Applicants should consult the Group booklet 'Student Apprenticeships' and state by which company or division they wish to be considered
Coventry Gauge & Tool Co. Ltd, P.O. Box 39, Fletchamstead Highway, Coventry CV4 9DA (Applications to: Training Officer)	Precision machine tools, cutting tools, general precision engineering	Production Mechanical Electrical	*16–17½ 'O' level* Day release to local technical college for O.N.C. and H.N.C. Those reaching sufficiently high standard in O.N.C. may transfer to sandwich course for degree (*Continued on page 15*)	Applications before 30th June; prefer local applicants for technician entry

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Coventry Gauge & Tool Co. Ltd, – *continued*			*17½–19½ 'A' level* Sandwich course for degree, usually at Lanchester Polytechnic. Company also sponsors 1:3:1 students at University of Warwick (which has special provision for applicants with 'A' levels in non-science subjects)	Applications before 31st July for thin sandwich course; by 15th January for 1:3:1 Sch 4–5 p.a.
Croda International Ltd, Cowick Hall, Snaith, Goole, Yorkshire ON14 9AA (Applications to: Executive Training Officer) Various *Works* throughout UK and *General Research Laboratories* at Hull	Wide range including lanolin, rolling oils, rust preventives, edible vegetable oils, adhesives, paints, edible and photographic gelatines, food additives, fertilisers, etc	Chemistry	*16–19 'O' level – 'A' level an advantage* Day release for O.N.C. and H.N.C. Laboratory, Works and Office training divided between Snaith and Hull. Scheme of approximately 3½ years' duration, intended to lead to junior management in Works, sales or technical service representative posts, research and development chemists, shipping executives etc *Note:* Company places most value on drive and ambition and will consider applicants without the basic academic qualifications, if prepared to study	Usually 3–4 p.a.
John Crossley & Sons Ltd, Dean Clough Mills, Halifax Part of Carpets International Ltd Group (Applications to: Personnel and Training Manager) Applications may also be sent to: Giltedge Carpets Ltd, Kidderminster	Carpets	Carpet Technology Textile Technology	*18–19 'A' level* One year's general training with company, then two-year sandwich course for O.N.D. in Textiles followed by H.N.D. in Carpet Technology at Kidderminster College, or degree in Textiles at Leeds University	Sch
Delta Metal Co. Ltd, Delta Works, Dartmouth Street, Birmingham 7 (Applications to: Group Training Officer) *Also* London area, North, Midlands, and overseas	Extrusion of copper-based alloys: brass foundry; metal refining; pressings, forgings, rolled metals, turned parts. Components of many types for industrial use	Mechanical Electrical Production Metallurgy Natural Sciences Mathematics	*16–17 'O' level* Day or block release for O.N.C. and H.N.C. *17–19 'A' level* Full-time, 1:3:1 or sandwich course for degree. Candidates find own place	G Sch (see section 3) P About 17 p.a.
J. & J. Denholm (Management) Ltd, 120 St Vincent Street, Glasgow C2	Shipowners	Marine (sea-going)	*16½–18 'O' level* Two-year O.N.D. course at Glasgow Nautical College, followed by one year at sea, then final year at college followed by two-year Company contract. Should attain First Class Certificate in Engineering at 25/26 *University entrance* Full-time degree course at Glasgow University	Entries by August Sch (£100 p.a. for four years at Glasgow University)

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Dennis Bros. Ltd, Guildford, Surrey (Applications to: Training Manager)	Commercial vehicles, municipal vehicles, fire engines, motor mowers, tractors	Automobile Electrical (Vehicle maintenance) Mechanical Production	*16–17½ Technician* Day release for O.N.C. and H.N.C.	4 p.a.
Department of the Environment Studentships in Mechanical and Electrical Engineering (Applications to: DEP/EP2/4 Department of the Environment, Room 543, Lambeth Bridge House, London SE1) *Training at:* Royal Military College of Science, Shrivenham, Wiltshire	Design, installation, operation and maintenance of plant and services for projects in Government Establishments at home and abroad including: heating, ventilating, air conditioning, refrigeration, electric power and lighting, airfield lighting, M.V. and H.V. distribution and protection, electrical control systems, power generators, communications, heavy mechanical plant installations, compressed air services, fuel oil storage, lifts and catering equipment	Electrical Electro-mechanical	*17–21 'A' level* Three-year degree course including practical training during the summer vacations, and leading to an appointment as Cadet or Graduate Engineer with further practical and professional training to meet the requirements of the Inst. of Mechanical and/or Electrical Engineers	Course begins in September Applications as early as possible same year Size of intake depends on no. of successful applicants Sch (all fees and maintenance grant)
The Dove Group, 98 Lower Addiscombe Road, Croydon, Surrey CR9 6AE (Applications to: Joint Managing Director for training scheme. For temporary positions apply to Personnel and Training Manager, The Dove Group, 127 Tunstall Road, Croydon CR0 6TZ or to the Manager of any branch) *Branches* in Croydon, Wimbledon and Woking	Distributors for British Leyland trucks and cars and vehicle accessories. Run a number of petrol stations and a self-drive hire fleet of cars and vans	Mechanical	*16½–17 'O' level or good C.S.E.* Indentured apprenticeship to age 21 in Motor Engineering Practice. Day release (one day a week) for study for O.N.C. Progress to administration or sales after apprenticeship, with good prospects of promotion to management	Applications by 15th June G (1 p.a.) P (temporary employment in petrol stations, clerical work, or cleaning cars)
Dowty Group Ltd, Arle Court, Cheltenham, Glos. (Applications to: Training Manager, Dowty Group Ltd, Arle Court, Cheltenham, Glos. *or to:* The Personnel Manager, Dowty Boulton Paul Ltd, Wolverhampton *or to:* The Personnel Manager, Coventry Precision Ltd, Earlsdon Works, Coventry)	Aircraft components (undercarriages, hydraulic equipment, propellors, engine fuel systems and flying controls). Hydraulic equipment for mining and railways. General industrial hydraulics. Oil seals. Jet units for marine applications	Mechanical Hydraulic Production Metallurgy and Materials Rubber Technology	*16–17 'O' level* Day or block release for O.N.C. and H.N.C. *17–18 'A' level* Sandwich course for H.N.D. or degree. Financial support and works practical experience while at university or technical college	G Sch Applications before January of year of entry 16–17 year olds are only recruited locally About 40 'A' level trainees p.a.

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Dunford Hadfields Ltd, East Hecla Works, Tinsley, Sheffield S9 1TZ	Steel	Mechanical Metallurgy	*'O' level* Day release for O.N.C., followed by degree in Metallurgy or Mech. Eng. at Sheffield University, or H.N.D. course at Rotherham College of Technology and Sheffield Polytechnic. Trainees recruited locally and no 'A' level candidates are taken	G Sch
Dunlop Ltd, *Engineering applicants:* Dunlop Engineering Group, Holbrooks Lane, Foleshill, Coventry *Science students:* Dunlop Ltd, Fort Dunlop, Erdington, Birmingham 24 (Applications to: Training Manager, in each case)	Rims, wheels, brakes, 'Maxaret' anti-skid units, pneumatic systems for the operation of aircraft auxiliary services, de-icing systems, guided missile components and flexible pipes for aviation and industrial use, rubber tyres and suspension for cars, hydrolastic suspensions	Mechanical Production Chemistry Physics Rubber Technology	*16 'O' levels* Day release for O.N.C. *17–18 'A' level* Day release for G.R.I.C., or G.Inst.P., or sandwich course for degree in Chemistry or Textile Physics. Sandwich or full-time course in rubber technology leading to A.N.C.R.T.	G Intake variable Sch
East Midlands Gas Board, De Montfort Street, Leicester (Applications to: Head of Training) Throughout East Midlands area but industrial periods would usually be at Leicester, Nottingham or Sheffield	Gas Board	Gas Engineering	*From 17 'A' level* Entrants normally proceed straight to a four-year sandwich course at the University of Salford, which leads to an honours degree in Gas Engineering. They should include Salford on the U.C.C.A. form	G Sch
Eastern Gas Board, Star House, Mutton Lane, Potters Bar, Herts. (Applications to: The Chief Education and Training Manager, The John Dyde Training College, Anchor Street, Bishop's Stortford, Herts.) Throughout Eastern Gas Board's area	Gas and coke	Chemical Eng. Civil Gas Mechanical	*17–19 'A' level* Sandwich degree course leading to Membership of appropriate professional body. Preference for City University, Salford University, or Enfield Polytechnic	G Sch
E.C.C. Quarries Ltd, St Stephen's House, Exeter EX1 1LJ (Applications to: The Training Officer) A member of the English China Clays Group. There are 38 quarries, manufacturing units and associated services mainly concentrated in the West Country but also in the London area, Leicester and St Neots	Sand, aggregates, coated stone, lime building blocks, paving and kerbstone, concrete pipes, standard and specialist concrete products	Quarry Management	*17–18 'A' level Maths. or Science (pref. Physics)* Thin sandwich course at Doncaster College of Technology of three years' duration, leading to the Diploma in Quarrying and Associate Membership of the Institute of Quarrying. Then two to three years' practical training for management	Sch (fees plus salary throughout course)

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1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Electric Power Storage Ltd, Clifton Junction, Swinton, Manchester M27 2LR (Applications to: The Training Manager)	Electrical storage batteries of all types. Brand names: Chloride, Dagenite, Exide, Chloride-Tudor	Electrical Mechanical Production Chemistry Metallurgy Physics	*16½ 'O' level* Day release for O.N.C. *17–18 'A' level* Sandwich course for degrees at Salford University (should be put on U.C.C.A. form) or H.N.D. at Salford College of Technology or Manchester Polytechnic. Some Chemistry trainees take Grad. R.I.C. by day release	G Sch 2–6 p.a.
Electricity Supply Industry For employment in *Generation and Transmission* enquiries should be sent to: Central Electricity Generating Board, Sudbury House, 15 Newgate Street, London EC1 For employment in *Distribution and Utilisation Engineering*, enquiries should be sent to the Area Electricity Boards, addresses as follows: London Electricity Board, 46 New Broad Street, London EC2M 1LS South Eastern Electricity Board, 10 Queen's Gardens, Hove, Sussex BN3 2LS Southern Electricity Board, Southern Electricity House, Littlewick Green, Maidenhead, Berks. South Western Electricity Board, Electricity House, Colston Avenue, Bristol BS1 4TS Yorkshire Electricity Board, Scarcroft, Leeds LS14 3HS North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne NE99 1SE Merseyside and N. Wales Electricity Board, Sealand Road, Chester Eastern Electricity Board, Wherstead, Nr. Ipswich, Suffolk (*Continued on page 19*)	Electricity supply	*C.E.G.B.* Electrical Mechanical Chemistry *Area Boards* Electrical	*Under 18 at start of training in September 'O' level* Day or block release for O.N.C. and H.N.C. Can qualify for higher courses according to progress *Under 19 at start of training in September* Normally, though not exclusively, thin sandwich course at university or polytechnic leading to a degree or H.N.D. Arrangements are made with the various regions as to the colleges students will attend. 1:3:1 scholarship holders make own arrangements (see section 3)	G Number of vacancies varies P Sch (see section 3 for 1:3:1 scholarships; supplementary grants are paid to thin sandwich students)

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Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Electricity Supply Industry – *continued* East Midlands Electricity Board, P.O. Box 4, North PDO, 398 Coppice Road, Arnold, Nottingham NG5 7HX Midlands Electricity Board, Mucklow Hill, Halesowen, Worcs. South Wales Electricity Board, St Mellons, Cardiff CF3 9XW North Western Electricity Board, Cheetwood Road, Manchester M8 8BA				
EMI Limited, Blyth Road, Hayes, Middlesex (Applications to: Training Manager) *Training at* Hayes, Ruislip, Feltham (Middlesex), and Wells (Somerset)	Advanced radar, aerials, colour camera tubes, cognitive machines, control equipment, infra-red systems, information storage, magnetic tape, microelectronics, photo-multipliers, recording equipment, solid state devices, special valves, telemetry etc, etc	Electrical Electronics Mechanical Physics	*16–17½ 'O' level* Day release for O.N.C. leading to H.N.C., or City and Guilds Certificate *17–19 'A' level* Full-time or thick sandwich university course, at university of student's choice. There is also a thin sandwich degree course, normally at Brunel University	G (1 year and 2 year post-graduate) Sch (see section 3) P
English Calico Ltd, 56 Oxford Street, Manchester M60 1HJ (Applications to: Group Appointments Manager) *Also at* Glossop	Textile products, from natural and man-made fibres	Chemistry	*16–17 'O' level, 18–19 'A' level* Day release course for O.N.C. and/or H.N.C. according to entry qualifications, followed by day release for A.S.D.C. or Grad. R.I.C. at Manchester Polytechnic. The latter may sometimes be completed by a full-time year at Salford University	3 p.a. G
Fairey Hydraulics Ltd, Heston, Middlesex (Applications to: Training Officer) **Fairey Engineering Ltd,** Stockport, Cheshire (Applications to: Personnel Officer)	Design and manufacture of aircraft hydraulic powered flying controls, high performance filtration equipment, servo valves, other hydraulic and electro hydraulic equipment Components for atomic reactors. Machine tool design and development. Design and development of structures in steel and aluminium, etc	Electrical Electronics Communications Mechanics Automatic Control Atomics	*16 upwards 'O' level – Engineer Apprenticeship* Day release for O.N.C., and selected students are then upgraded to thin sandwich course for B.Tech. at Brunel University	

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
J. H. Fenner & Co. Ltd, Marfleet, Hull (Applications to: Personnel Manager)	Power transmission equipment	Mechanical Chemistry for Rubber and Textile Technology	*Engineering* *16–17 'O' level* Day release for O.N.C. and H.N.C. Those who make satisfactory progress may be selected for sandwich course for degree *Chemistry* *16–18 'O' or 'A' level* Day release for O.N.C. and H.N.C. Those with two 'A' levels go straight on H.N.C. course, followed by a one-year full-time sponsored course at National College of Rubber Technology leading to Associateship of the Institution of the Rubber Industry (A.I.R.I.)	G
Ferranti Ltd, Hollinwood, Lancs. (Applications to: Head of Education and Training) *Training* provided within Manchester and Oldham group of factories	Power transformers, meters, precision instruments, industrial valves, silicon semi-conductors, electronic devices, digital computer systems, guided weapons control systems, radar and aircraft equipment and gyroscopic instruments	Electrical Electronics Mechanical Physics	*Under 17·6 on 1st Sept., 'O' level* Day or block release for O.N.C. Day release for H.N.C., and City and Guilds Technician Final and Full Technological Certificates. Can qualify at O.N.C. stage for transfer to sandwich degree course *Under 19·6 on 1st Sept. 'A' level* Thin sandwich course for H.N.D. or B.Sc. Honours degree, or 1:3:1 course	G P Sch 50–60 p.a. normally
Ferranti Ltd, Ferry Road, Edinburgh 5 (Applications to: Personnel Officer)	Airborne and ground radar and fire control equipment; electronic components	Electronics Mechanical Electrical	*16–17 'O' level Technician* Day release for O.N.C. After one or two years, selected candidates may be sponsored for sandwich degree course, often at Brunel University. Others continue for H.N.C. by day release *18–19 'A' level* *Pre-University training* This is a six-months training mainly for Cambridge entrants, including basic workshop training, and a period in design and development	About 2 p.a. Sch (salary and fees paid throughout) P (not tied to sandwich course, see previous column)
Ford Motor Co. Ltd, Warley, Essex (Applications to: Apprentice Supervisor, Room 34/138, Faringdon Avenue, Harold Hill, Romford, Essex RM3 8ST) *Training also at:* Basildon Dagenham, Dunton	Motor vehicles	Mechanical Automobile Production Industrial Vehicle Metallurgy Materials Technology	*17–19 'A' level* Four-year sandwich course leading to B.Sc./B. Tech. in Mech. Eng. at University of Bradford or University of Salford; B.Tech. in Automobile Eng. or Production Eng. or Metallurgical Eng. at Loughborough University; B.Sc. in Production Eng. at University of Aston. *Include as appropriate on U.C.C.A. form*	G P Sch (see section 3) 25 vacancies p.a. for Student Engineers

(*Continued on page 21*)

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Ford Motor Co. Ltd – *continued*			Also B.Sc. in Industrial Eng. and B.Sc. in Vehicle Eng. at Hatfield Polytechnic. Metallurgy and Materials Technology students take four-year sandwich course for B. Tech at Brunel University	2 p.a. for Metallurgy or Materials Technology
Foseco International Ltd, Long Acre, Birmingham B7 5JR (Applications to: Personnel Department) *Also at* Drayton Manor, Nr. Tamworth, Staffs.	Chemical and metallurgical products for the foundry and steelworks industries	Chemistry Metallurgy	*Age limits flexible, 'O' or 'A' level* All trainees start on day release for O.N.C. or H.N.C. followed by Grad. R.I.C. or A.I.M. Final qualification year may sometimes be done full-time at a local college. A few selected after first year for sandwich degree course	G 2–3 p.a.
THE GENERAL ELECTRIC CO. LTD A brochure 'From School to Industry' will be sent on application to the Personnel Department, The General Electric Co. Ltd, 1 Stanhope Gate, London W1Y 6AA	One of the world's largest electrical groups, formed from mergers in 1967 and 1968 between G.E.C., A.E.I. and English Electric. Products range from steam turbine generators to the smallest devices of micro-electronics, and include diesel engines, cables, telecommunications, radar and avionics, control systems, communications satellites and ground stations, computers, switchgear, gas turbines, locomotives and traction equipment, lamps and lighting, domestic appliances etc.	*See below*	*See below*	G P H (in some areas) Sch (supplementary to L.E.A. grant, but all companies can vary or extend the arrangements when circumstances warrant)
1 G.E.C. POWER ENGINEERING **G.E.C. Power Engineering Ltd,** Trafford Park, Manchester M17 1PR (Education Manager)	Large steam turbines, industrial and marine steam turbines	Mechanical Production Electrical Electronics Applied Physics Chemistry Metallurgy Mathematics	Technician and Student. Thin and 1:3:1 sandwich courses for degrees at universities, polytechnics or colleges of technology. 1:3:1 students have free choice of university; thin sandwich applicants should consult the training location as to whether any colleges are preferred. Science vacancies only occasionally.	Candidates are asked to indicate at interview the particular products or functions in which they are interested Apply Oct./Dec.
English Electric – A.E.I. Turbine Generators Ltd, Willans Works, Rugby, Warwickshire (Manager, Personnel and Education)	Large steam turbines	Mechanical Chemistry	At Stafford, mainly thin sandwich, but some 1:3:1 courses in Mech. Eng., Computer Science and Power Electrical Eng.	

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1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
English Electric Ltd, Stafford (Manager – Central Education)	Electrical generators	Mechanical Electrical Computer Science Chemistry		
G.E.C. Power Engineering Ltd, Cambridge Road, Whetstone, Leicestershire (Education Officer)	Gas turbines	Mechanical		
English Electric Reactor Division, Cambridge Road, Whetstone, Leicestershire (Head of Administration)	Reactor systems	Mechanical		
2 ENGLISH ELECTRIC – A.E.I. MACHINES LTD, Mill Road, Rugby, Warwickshire (The Senior Recruitment Officer) *Also at* Bradford, Farsley, Doncaster, Warley (Worcs.), Newcastle (Staffs.), Witton (Birmingham)	Electrical rotating machines from fractional h.p. to about 70,000 h.p. both A.C. and D.C.	Mechanical Production Power Electrical Mathematics	Technician and Student. 1:3:1 and thin sandwich courses for degrees (sometimes H.N.D.) Free choice of university for 1:3:1 students. Company has close contact with Lanchester Polytechnic (at Rugby) for thin sandwich courses, but will consider other colleges	Apply as early in last school year as possible
3 ENGLISH ELECTRIC DIESELS **English Electric Diesels Ltd,** Ruston Lincoln Estates Division, P.O. Box 25, Lincoln (Senior Training Officer) Ruston Paxman Diesels Ltd, Vulcan Works, Newton-le-Willows, Lancs. (The Senior Training Officer) **Standard Ironworks,** Colchester, Essex (The Senior Training Officer) **Dorman Diesels Ltd,** Tixall Road, Stafford (The Personnel Manager)	Diesel engines from 5 h.p. to 8850 h.p. – Dorman, English Electric, Kelvin, Napier, Paxman, Ruston – gas turbines, turbo blowers, hydraulic motors	Mechanical Production Light Electrical	Technician and Student. Thin and 1:3:1 sandwich courses at universities and colleges; thin sandwich for H.N.D. Light Electrical Eng. offered at Colchester only. Students are currently sponsored at Brunel, Bath, Salford and Aston Universities, and at Lanchester, Trent, and Hatfield Polytechnics	12 p.a. H
4 G.E.C. – MARCONI ELECTRONICS **The Marconi Co. Ltd,** Marconi House, Chelmsford CM1 1PL *Works at:* Chelmsford, Basildon, Gateshead, Birmingham, Wembley (Chief Training Officer, Chelmsford)	Capital electronic equipment; radar communications, broadcasting, etc	Electrical Mechanical Production Applied Mathematics Applied Physics Computer Science	*16–17 'O' level Technician Apprentice* Block release for O.N.C. and H.N.C. (4 year course) *17–19 'O' level plus science VI course but having failed 'A' or achieved one pass* Block release for O.N.C. and H.N.C. (3 year course) *17–19 'A' level Student Apprentice* Thin or 1:3:1 sandwich degree course. For thin sandwich, Company has arrangements with the following (*Continued on page 23*)	Apply after Christmas in last year at school About 35 technicians p.a. For Student apprenticeship apply as early as possible after

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
The Marconi Co. Ltd, – *continued*			universities which should be included among U.C.C.A. choices: *Electrical/Electronic Engineering* Loughborough, Brunel, Bradford *Applied Mathematics* Brunel *Production Engineering* Loughborough *Mechanical Engineering* Aston Mechanical Eng. also sponsored at Hatfield Polytechnic, Applied Physics at Brighton Polytechnic, Computer Science at Hatfield. 1:3:1 applicants should preferably be choosing one of the following Universities: Bangor, Birmingham, Bristol, Cambridge, Essex, London (Imperial College), Manchester, Nottingham, Oxford, Southampton	September in last year at school 35 thin sandwich students p.a. 15–20 1:3:1 students G P H
Elliott Automation Ltd, Elstree Way, Borehamwood, Herts. (Training Officer)	Avionic systems; specialised radar detection systems; X-ray devices, lasers	Mechanical Production Electrical Electronics Physics Mathematics ComputerScience	Technician and Student entries Mainly thin sandwich degree courses but some 1:3:1 places for Mathematics and Computer Science	
Elliott Automation Ltd, Hillend Industrial Estate, By Dunfermline, Fife (Training Officer)	Development of simulators such as aircraft cockpits and submarine control rooms	Production	Technician and Student entries. Thin sandwich degree course only	
Marconi Space and Defence Systems Ltd, Chobham Road, Frimley, Camberley, Surrey	Development of weapon control systems and military operational centres; control units for rockets and satellites; investigation of space, military and related civil field systems	Mechanical Physics Mathematics ComputerScience Electronics	Technician and Student entries. Only occasional vacancies in Mech. Eng., Physics and Mathematics. 1:3:1 and thin sandwich degree courses. Free choice of college or university. Technician entrants have block release for O.N.D. and may go on to H.N.D. or transfer to degree course	
G.E.C. – A.E.I. Electronics Ltd, New Parks, Leicester LE3 1UF (Training Officer)	Large surveillance and target tracking radar and marine radar; power servo-systems	Mechanical Production Electronics Mathematics	Technician and Student entries. Thin and 1:3:1 sandwich degree courses. No H.N.D. Flexible as to choice of college or university as long as course is suitable	
G.E.C. – A.E.I. Electronics Ltd, The Grove, Warren Lane, Stanmore, Middlesex (Training Officer)	Space and defence systems; satellite communications; control engineering for weapon guidance systems	Mechanical Electronics Physics Mathematics	Student entry only. 1:3:1 course for Mechanical Eng., either 1:3:1 or thin sandwich degree for others. Occasionally H.N.D. 1:3:1 students have free choice of university. Thin sandwich students should consult the Company – many go to Brunel University	

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1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
G.E.C. – A.E.I. Electronics Ltd, Broad Oak Works, The Airport, Portsmouth, Hants. PO3 5PQ (Training Officer)	Space and defence systems; electronic equipment for use in satellites including data transmission and command equipment	Electronics	Technician and Student entry. Thin or 1:3:1 sandwich degree course; no H.N.D. 1:3:1 students normally go to Southampton, Bristol or Essex University; thin sandwich degree at Portsmouth Polytechnic	Prefer applicants resident in area
Elliott Flight Automation Ltd, Airport Works, Rochester, Kent (Training Officer)	Avionic Systems; automated aircraft systems as applied to flight control, automatic landing, engine instrumentation and control; inertial navigation systems and head-up displays	Production Electronics	Technician and Student entry. Thin sandwich degree courses only; own choice of college or university. Present students are at City, Bradford and Brunel Universities and Brighton Polytechnic. If fail to reach standard for degree, can take H.N.D. at Medway and Maidstone College of Technology	
Marconi Instruments Ltd, Longacres, St Albans, Herts. (Training Officer)	Test equipment, oscilloscopes and signal generators, X-ray image intensifiers for medical applications, programmable fully automatic test systems	Electronics Computer Science Production Industrial	Technician and Student entries. 1:3:1 for Electronics only; otherwise thin sandwich degree course. Free choice of university for 1:3:1 students. Thin sandwich course at University of Salford, Loughborough or Brunel, or Hatfield Polytechnic. No H.N.D. but students who do not reach degree entrance level can take O.N.C. in one year by block release and then transfer to degree sandwich course	
5 THE ENGLISH ELECTRIC VALVE CO. LTD, Waterhouse Lane, Chelmsford, Essex CM1 2QU (Training Officer) *Production units also at* Maldon (Essex) and Lincoln	Specialised valves and tubes for broadcasting, telecommunications, radar and industrial electronics. *Microwave Division* produces magnetrons klystrons and travelling wave tubes; *Light Conversion Devices Division* specialised electronic tubes and *Power Valve Division* heavy duty valves also gas lasers	Light Electrical Applied Physics	Thin sandwich degree course at City University or Loughborough University; Company is prepared to consider students with provisional acceptance at other universities. If students apply direct to the Company, degree course places will be arranged at Brighton, Hatfield or Lanchester Polytechnics. There is also a thin sandwich course for H.N.C. in Electrical and Electronic Eng. at Mid-Essex Technical College, leading to post of Technician Engineer. No 1:3:1 courses or H.N.D. courses	Apply at start of final school year
6 G.E.C. – A.E.I. TELECOMMUNICATIONS LTD, P.O. Box 53 Telephone Works, Coventry CV3 1HJ (The Controller of Training) *Also at:* Coventry, Rugby, Co. Durham, Yorkshire, Fife, Glamorgan	Largest manufacturer of telecommunications equipment in UK, from smallest intercommunication system to largest international network. Four main product divisions are Transmission, Private Systems, Telephone, and Telephone Switching	Mechanical Production Light Electrical Electronics	Technician and Student entry. Thin or 1:3:1 sandwich courses at universities or polytechnics. Free choice of university for 1:3:1 students, most of whom take Electronic or light-current Electrical Eng. Thin sandwich students are sponsored at the University of Aston, Bradford University or Lanchester Polytechnic. For Technicians, three-year sandwich course at Coventry Technical College for Diploma in Telecommunications and Electronic Eng.	H at Coventry Apply at start of final school year

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Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
7 HIRST RESEARCH CENTRE East Lane, Wembley, Middlesex (The Staff Manager)	Research and development for all parts of G.E.C. and for Government Departments	Light Electrical Electronics Physics Mathematics Computer Science Chemistry Metallurgy	Technician and Student entry. 1:3:1 university courses mainly in Physics or Electrical Eng. with own choice of university. No thin sandwich courses. Day release for H.N.C. in science subjects	3 Thick sandwich Students p.a.
8 G.E.C. – ELLIOTT AUTOMATION **G.E.C. – Elliott Control Valves Ltd,** Airport Works, Rochester, Kent *Also in* Fifeshire	Automatic fluid control equipment for the chemical processing industry	Mechanical	Thin sandwich course for degree or H.N.D., no Technician entry. Student makes own choice of college	
G.E.C. – Elliott Process Instruments Ltd, Century Works, Lewisham, London SE13 *Other units* S.E. and N.W. of England	Pneumatic, electric and electronic instruments; all types of nucleonic instrumentation for submarines and power stations; X-ray spectroscopy; gas analysis equipment	Mechanical Electronics Physics Mathematics Computer Science	Mainly Technician but a few Student entries occasionally. Technicians can be upgraded at O.N.C. stage to degree or H.N.D. sandwich course. A sponsored Student could make own choice of college (usually thin sandwich)	
G.E.C. – Elliott Precision Controls Ltd, Century Works, Lewisham, London SE13 *Other units* S.E. and N.W. of England	Strain gauge load cells for measurement of weight or force; recording instruments; computing devices; automation systems and automatic mechanical systems			
G.E.C. Elliott Automation Ltd, Scientific Apparatus Division, Barton Dock Road, Urmston, Manchester M31 2LD *Also at* Harlow, Essex	Mass spectrometers, electron microscopes, X-ray equipment	Electronics Physics	1:3:1 courses only. No Technician entry. Own choice of university	
G.E.C. – Elliott Process Automation Ltd, New Parks, Leicester LE3 1UF *Also at* Borehamwood and Kidsgrove	Computerised process control systems for paper mills, food production etc	Production Power Electrical Light Electrical Electronics Physics Mathematics Computer Science	Technician and Student entries. Thin and 1:3:1 sandwich degree courses in all branches. A few students take H.N.D. Free choice of college or university	
G.E.C. – Elliott Industrial Controls Ltd, Kidsgrove, Stoke-on-Trent ST7 1TW	Industrial controls from small components to largest custom-built equipment and power rectifier installations	Mechanical Light Electrical Electronics	Technician and Student entries. Thin sandwich course only; only occasional vacancies in Mechanical Eng. Some H.N.D. courses. Most students attend North Staffordshire Polytechnic	

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
G.E.C. – Elliott Traffic Automation Ltd, East Lane, Wembley, Middlesex HA9 7PL	Road signalling equipment for local authorities; solid state systems with integrated circuits; motorway signalling systems	Light Electrical Electronic	Thin sandwich degree course only. No Technician entry. No preference as to college but intake very small	
G.E.C. Electrical Projects Ltd, Mill Road, Rugby, Warwickshire *Also at* Kidsgrove (Applications to Personnel Manager of the unit or units in which the student is interested)	Comprehensive electrical projects covering metal industries, mining, power and marine installations, paper and plastics industries; automation systems for power generation and distribution industries and ships	Production Power Electrical Light Electrical Electronics Mathematics Computer Science	Technician and Student entries. Thin and 1:3:1 sandwich degree course in all branches. H.N.D. course available. Company will advise 1:3:1 students if any of their U.C.C.A. choices are unsuitable. Thin sandwich students normally go to Lanchester Polytechnic (at Rugby)	
9 MARCONI ELLIOTT COMPUTER SYSTEMS LTD, Elstree Way, Borehamwood, Herts. (The Personnel Manager) *Also in* Fifeshire	Combines the computer interests of Elliott Automation, Marconi and English Electric Scientific ranges of fast computers, many purpose-built, including miniature machines. Hardware and Software	Mechanical Production Light Electrical Electronics Physics Mathematics Computer Science	Technician and Student entries. Mainly thin sandwich degree courses, but 1:3:1 possible in Mathematics and Computer Science. Flexible as to colleges, but most students attend Hatfield or Lanchester Polytechnic, the Polytechnic of North London, Hendon College of Technology, City University, Loughborough University, University of Bradford. Computer Students go to University of Manchester I.S.T.	
10 OSRAM (G.E.C.) LTD, P.O. Box 17, East Lane, Wembley, Middlesex HA9 7PG (The Personnel Manager) *Factories at* Wembley, Manchester, Newcastle, Birmingham, Erith and St Helens	Lamps and lighting fittings; lighting schemes for public and industrial concerns	Mechanical Production Light Electrical Physics	Technician and Student entries. Thin sandwich degree courses only, normally at colleges in London area including Brunel University, the Polytechnic of the South Bank, and Hendon College of Technology	Prefer applicants resident in London
11 TELEPHONE CABLES LTD, Dagenham, Essex (The Personnel Manager)	Largest company in Europe concerned with manufacture and installation of telephone cables. Principal supplier to G.P.O.	Mechanical Production Power Electrical Light Electrical Electronics	Technician and Student entries. Thin sandwich degree courses only, usually at North East London Polytechnic	
12 ASSOCIATED AUTOMATION LTD, 70 Dudden Hill Lane, London NW10 1DJ (The Personnel Manager)	Vending machines; coin collecting boxes for Post Office; duplicators, relays for control systems	Mechanical Production Light Electrical Electronics	Technician and Student entries. Thin sandwich degree course only. Prefer colleges and universities in London area	

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Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
13 G.E.C. CABLES AND EQUIPMENT **A.E.I. Cables Ltd,** Crete Hall Road, Gravesend, Kent (The Personnel Manager) *Also at* Birtley (Co. Durham)	All types of electric cable for transmission and distribution purposes	Electrical Mechanical	Technician and Student entries. Thin sandwich degree courses only, preferably (but not essentially) at City University, Brunel University or Thames Polytechnic	
English Electric Fusegear Ltd, East Lancashire Road, Liverpool L10 5HB (The Personnel Manager)	H.R.C. fuse-links, M.V. and H.V. for industry and electricity supply; fuse handles and bases, distribution fuseboards	Mechanical Production Power Electrical	Technician and Student entries. Thin sandwich degree courses only; not many vacancies, free choice of college	
14 THE EXPRESS LIFT CO. LTD, Abbey Works, Weedon Road, Northampton NN5 5BT (The Personnel Manager)	Lifts and escalators	Mechanical Electrical Electronics	Technician and Student entries. Thin sandwich courses are supported at University of Aston and Lanchester Polytechnic (at Rugby). Sometimes thick sandwich degree course at Nottingham University	
15 G.C.E. ELECTRICAL COMPONENTS LTD **Salford Electrical Instruments Ltd,** Peel Works, Barton Lane, Eccles, Manchester M30 0HL (The Personnel Manager) *Also at* Rochdale	Components, capacitors, electrical measuring instruments, selenium rectifiers, thermostats, quartz crystal units and test equipment, electronic instruments	Light Electrical Electronics	Limited places available for thin sandwich courses in Light Electrical Eng. at University of Salford or Bradford, or Electrical/Electronic course at John Dalton College of Technology for H.N.C. (for Technicians)	
16 G.E.C. – HENLEY LTD, Crete Hall Road, Gravesend, Kent (The Personnel Manager) *Also at* Halesowen, Worcs.	Distribution and installation equipment; sub-station distribution pillars, complete rising mains systems, fuse switchgear, plugs	Electrical Production	Thin sandwich degree courses only. Free choice of college, with some preference for London or South East area	
Giddings & Lewis Fraser Ltd, Arbroath, Angus, Scotland (Applications to: Training Department)	Numerically controlled and special purpose machine tools; textile machinery	Mechanical Electrical Production	*17–18 S.C.E. 'O' Grade* Day release for O.N.C. with possible promotion to sandwich course for H.N.D. Others continue to H.N.C. *17–18 University or College entrance standard* University or College of Technology course on thick or thin sandwich basis. Students normally attend colleges or universities in Scotland, and the Company has a special arrangement with Dundee College of Technology	G P Sch Closing date for applications – mid-April About 2 p.a.

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Goodlass, Wall & Co. Ltd, Goodlass Road, Speke, Liverpool L24 9HJ (Applications to: The Personnel Manager)	Paints, varnishes, lacquers and allied materials	Chemistry	*17–21 'A' level* Day release for H.N.C. or Grad. R.I.C.	G Intake variable P – not tied to sandwich course – would consider one year before university
Greater London Council, County Hall, London SE1 7PB (Applications to: The Director of Establishments (PSI)) Applicants are advised to read the Council's literature before applying		Building Building Surveying Quantity Surveying Civil Engineering (Technician)	*16–22 'A' level – Building* Day release for two-year course for O.N.C. Construction, then further two years for H.N.C. (Building). May be followed by membership of the Society of Surveying Technicians *18–25 'A' level – Building Surveying* Part-time day release Diploma course leading to full exemption from final of R.I.C.S. *18–25 'A' level – Quantity Surveying* Part-time day release Diploma course leading to full exemption from final of R.I.C.S. *Up to 21 'O' level – Civil Engineering Technician* Day release for O.N.C. (Engineering) or O.N.C. (Construction) leading to H.N.C. in Civil Engineering and Technicians' Certificate	12–18 p.a. Interviews mainly at Easter but some Technicians June-July 25–35 p.a.
Applications to: Director of Mechanical Engineering Services, Room 510, 1 Queen Anne's Gate Buildings, Dartmouth Street, London SW1 Applications to: Scientific Adviser, Greater London Council, County Hall, London SE1 7PB		Electrical Environmental (Heating and Ventilation) Mechanical Chemistry Physics	*18–22 'A' level* Thin sandwich B.Sc. courses at Polytechnic of the South Bank for Electrical or Environmental Eng. or City University or Thames Polytechnic for Mechanical Eng. *16–25 'O' level (five)* Day release leading either to two 'A' levels in science subjects or to O.N.C. in Chemistry or Physics *18–25 'A' level* Day release for H.N.C. or equivalent in Chemistry or Physics	3 p.a. in each branch Interview Easter Interviews from Easter to end of school year – apply early in final school year 10 p.a. combined
GR-Stein Refractories Ltd, Genefax House, Tapton Park Road, Sheffield S10 3FJ (Applications to: Personnel Manager)	Complete range of ceramic high temperature materials for all industrial processes and applications where heat is involved, including the production of iron (*Continued on page 29*)	Chemistry Ceramics Metallurgy Chemical Eng. Refractories Materials Sciences	*17–18 'O' level only* Day release for O.N.C. and H.N.C. in appropriate disciplines. According to O.N.C. result, may transfer to thin sandwich degree course at Sheffield Polytechnic or (for Ceramics) North Staffordshire Polytechnic	G 3 p.a.

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
GR-Stein Refractories Ltd – *continued* *Also at* Central Research Department, Sandy Lane, Worksop, Notts.	and steel, non-ferrous metallurgy, and the manufacture of glass and cement			
Guest Keen & Nettlefolds Group of Companies mainly in the Midlands and South Wales (Applications to: The Director of Administration (SB), Guest Keen & Nettlefolds Ltd, 22 Kingsway, London WC2B 6LG)	The majority of GKN companies are concerned with the manufacture of finished and semi-finished products for every industry in almost every country in the world: forgings, castings, pressings, fasteners, vending machines, machine tools, vehicle wheels, furnaces, plastics machinery and products, engineering equipment, equipment for brewing, for welding, for mining, as well as components for motor and commercial vehicles of every type	Electrical Mechanical Production Structural Design Metallurgy	*Up to 19½ – 'O' or 'A' level according to age* Trainees undergo practical training with block release or thin or thick sandwich courses leading to H.N.C., H.N.D. or degrees, according to their starting qualifications. Students make their own arrangements with colleges and universities	G P Sch No definite closing date but should apply in early Spring 40–50 vacancies p.a.
G. N. Haden & Sons Ltd, 7-12 Tavistock Square, London WC1H 9LZ (Applications to: Group Personnel Manager)	Design and installation of mechanical services for all kinds of buildings and industrial premises	Mechanical, then Heating and Ventilating (Environmental Engineering) Electrical	*16–17 'O' level* Day release for O.N.C. in Mech. Eng. then sandwich course for Diploma in Environmental Engineering at Polytechnic of the South Bank, Newcastle-upon-Tyne Polytechnic, or Grimsby College of Technology *Up to 18 'A' level* Honours degree in Environmental Engineering at University of Strathclyde, Liverpool, Loughborough, or Bath	G P Sch About 12–15 Diploma Students p.a. and about 15 degree Students
Hamworthy Engineering Ltd, Fleets Corner, Poole, Dorset (Applications to: Training Officer)	Pumps and compressors; combustion equipment; hydraulic equipment	Mechanical Production Design	*18–18½ 'A' level (age limits flexible)* *Student* Thin sandwich course for degree in Mech. or Prod. Eng. usually at Brunel, Loughborough, Bath or City University. No 1:3:1 students	5 p.a. Preference given to students resident in area local to works Sch (supplement to L.E.A. grant plus lodging allowance)
Hawker Siddeley Aviation Ltd, (Applications may be made to the Education and Training Officer at any of the following units: H.S.A. Brough, Brough, Nr. Hull, Yorks.	Aircraft	Aeronautical Mechanical Electrical Production Applied Physics Mathematics Metallurgy ComputerScience	*Up to 17½ 'O' level* Day release for O.N.C. followed by sandwich course for H.N.D. Good results in the O.N.C. can gain entry to a thin sandwich degree course (*Continued on page 30*)	Vacancies are limited in science and computer fields and application should be made as early as possible

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Hawker Siddeley Aviation Ltd – *continued* H.S.A. Hatfield, Hatfield, Herts. H.S.A. Kingston, Richmond Road, Kingston-upon-Thames, Surrey H.S.A. Manchester. Greengate, Middleton, Manchester)			*Up to 19 'A' level Engineering or Student apprenticeship* (*Two 'A' levels*) Thin sandwich H.N.D. course followed by professional study *Undergraduate apprenticeship* Thin sandwich or 1:3:1 degree course. For the thin sandwich course each factory has associations with local technological universities and polytechnics and may prefer students to study at a particular college. Write to the factory concerned for its policy on this	G P Sch
Hawker Siddeley Power Transformers Ltd, Forest Works, Fulbourne Road, Walthamstow, London E17 4EF (Applications to: Training Officer)	Large power transformers, on-load tap changers, control gear	Electrical Mechanical Production	*Up to 17 'O' level* Day release for O.N.C. and H.N.C. *Up to 18½ 'A' level* Thin or thick sandwich courses for degrees at university of student's choice, or (with one 'A') thin sandwich for H.N.D.	G Sch P Closing date 1st June
Hayward Tyler & Co. Ltd, Luton, Beds. (Applications to: The Training Manager)	Pumps, turbines, electric motors, etc	Mechanical	*16–17 'O' level* Day release for O.N.C. Promotion to sandwich course on merit *18–19 'A' level* Thin sandwich course for degree. Those with one 'A' level take H.N.D. Some preference for Aston, Brunel, or City University, Hatfield Polytechnic, or Luton College of Technology. No 1:3:1 courses	G Sch (see section 3) 2 p.a. Closing date 1st May
H. J. Heinz Co. Ltd, Hayes Park, Hayes, Middlesex (Applications to: Personnel Officer) Employment may be at: Head Offices at Hayes; the London NW10 Factory or at the Northern Factories in Lancashire P – *Note on Pre-University Training* Students selected for sandwich courses in food technology and engineering spend one year in industrial training with the Company before proceeding to university. There are also occasional vacancies in the laboratories for young men wishing to spend a year in industry before going to university to study chemistry or biological sciences	Food	Chemistry Food Technology Engineering (Mechanical or Electrical) Food Science, Microbiology or Applied Biology	*17–19 'A' Chemistry and one or two other science subjects* Day release for H.N.C. and Grad. R.I.C. *17–19 'A' Chemistry and Physics plus another science* Four-year sandwich course at National College of Food Technology, Reading University, for B.Sc. Food Technology *17–19 'A' Maths and Physics* Four-year sandwich course for B.Tech. at Brunel University *17–19 Two 'A' level sciences* Day release for H.N.C. and Inst. of Biology qualifications	3–5 p.a. 2–3 p.a. 1 p.a. 1 p.a. Apply as early as possible in final school year G Sch (see section 3) P – see note in first column

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Alfred Herbert Ltd, P.O. Box 30, Edgwick Works, Coventry CV6 5GT (Applications to: Personnel Services Manager) Seven companies in Group, of which main sponsoring Company is Herbert-BSA Ltd, at Birmingham, Coventry and Leicester. Other sites are Godalming (Surrey), Altrincham and Runcorn (Cheshire), Rugby, Rotherham, Falmouth, Letchworth and Daventry	Machine tools	Mechanical Production Electrical	*16–18 Technician Apprenticeship 'O' level* Day release for O.N.C. and H.N.C. Outstanding progress may qualify at O.N.C. stage for sandwich studies leading to B.Sc. or membership of Professional Institutions *18–19 Student Trainees 'A' level* Sandwich course for B.Sc. honours or ordinary at Lanchester Polytechnic. Other colleges would be considered, reflecting the distribution of factories within the Group	G Sch
Holman Brothers Ltd, Camborne, Cornwall (Applications to: Personnel Manager) A member of International Compressed Air Corporation	Compressed air machinery, fluidics and control systems	Mechanical Production	*16–17 'O' level* Sandwich course for O.N.D. at Cornwall Technical College *17–18 'A' level* One 'A' level: Sandwich course for H.N.D. at Cornwall Technical College Two 'A' levels: Degree course for B.Sc. at Portsmouth Polytechnic	Sch 4 p.a.
Hoover Ltd, Perivale, Greenford, Middlesex	Domestic electrical and gas appliances and electric motors	Electrical Mechanical Production	*Up to 18 'A' level* Sandwich course at Brunel or Loughborough Universities for B.Tech. Sponsorships for H.N.D. in engineering are also considered locally	G Sch About 6 vacancies p.a.
Hunting & Sons Ltd, Milburn House, Newcastle-upon-Tyne NE99 1TA (Applications to: Personnel Manager)	Tanker and cargo ship owners	Marine (sea-going)	*16–18 'O' level* Two years at technical college for O.N.D.; one year afloat; one year ashore training in Engineering establishment approved by Dept. of Trade and Industry	Closing date 31st May each year 4 p.a. H
IBM United Kingdom Laboratories Ltd, Hursley Park, Winchester, Hants. *or* **IBM United Kingdom Ltd,** P.O. Box 30, Inverkip Road, Spango Valley, Greenock, Renfrewshire *or* **IBM United Kingdom Ltd,** P.O. Box 6, Solent Road, Havant, Hants. (Applications to: The Personnel Manager in each case)	Electronic data processing systems and office equipment	Mathematics Computer Science Engineering	*17–19 'A' level* Four-year thin sandwich course at technological university or polytechnic, leading to an honours degree *Note:* Engineering is not offered at the Hursley Park Branch	Sch (see section 3) G P (see section 3)

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Imperial Chemical Industries Ltd, Central Personnel Department, Imperial Chemical House, Millbank, London SW1 (Applications to: The Personnel Department of the Division concerned) *Locations* Agricultural Division, Billingham, Teesside Dyestuffs Division, Hexagon House, Blackley, Manchester 9 ICI Fibres Ltd, Hookstone Road, Harrogate, Yorkshire Heavy Organic Chemicals Division, Wilton Works, Middlesbrough, Yorkshire Mond Division, The Heath, Runcorn, Cheshire Nobel Division, Nobel House, Stevenston, Ayrshire Paints Division, Wexham Road, Slough, Bucks. Pharmaceuticals Division, Alderley Park, Macclesfield, Cheshire Plant Protection Limited, Fernhurst, Haslemere, Surrey Plastics Division, Bessemer Road, Welwyn Garden City, Herts.	ICI's interests include synthetic fibres, plastics, fertilisers and other agricultural chemicals, dyestuffs, pharmaceuticals, paints and industrial explosives (for details see brochure mentioned in Notes column)		Variable according to Division concerned *16–19 Minimum four 'O' levels* Day release or sandwich courses for O.N.C. and H.N.C., Grad. R.I.C., City and Guilds; can qualify at O.N.C. level for sandwich course for H.N.D. or degree. 'A' level entrants take thin sandwich courses for H.N.D. or degree, and some Divisions have 1:3:1 schemes	G P Sch H in some Divisions Intake variable according to Divisional needs Full details in brochure 'Into Industry' obtainable from Central Personnel Department All Divisions recruit Laboratory Assistants Student Apprentices are recruited by Agricultural Division, Heavy Organic Chemicals Division, and Mond Division
		Mechanical Electrical Chemical Eng. Instrument Control Electronics (only Mech. and Electrical for Heavy Organic Chemicals Division) Chemistry Physics Metallurgy Biochemistry Biology and various technologies (textiles, leather, paper, plastics, paints, rubber etc)		
Imperial Metal Industries (Kynoch) Ltd, Witton, Birmingham B6 7BA (Applications to: Kynoch Group Personnel Manager) *Other locations* South Wales, Leeds, Wolverhampton	Manufacture and fabrication of non-ferrous metals and alloys, ammunition, printing, zip fasteners, etc	Mechanical Metallurgy	*16–18 Technical Apprenticeship* 'O' level entrants take day release course for O.N.C. and H.N.C. but can qualify at O.N.C. for transfer to Student Apprenticeship. Entrants with one 'A' level take thin sandwich course for H.N.D., which can lead to the C.E.I. Part 2 and membership of a professional engineering Institution. *16–17 Laboratory technician 'O' level* Day release for O.N.C. and H.N.C. followed by professional qualifications	

(*Continued on page 33*)

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Imperial Metal Industries (Kynoch) Ltd – *continued*			*17–20 Student Apprenticeship* Thick and thin sandwich degree courses at universities and polytechnics of student's choice	About 6 p.a. for Mech. Eng.; 'a few' for Metallurgy P Sch G
International Computers Ltd, ICL House, Putney, London SW15 (Applications to: Recruitment and Academic Relations, Computer House, Euston Centre, London NW1) *Training Centres:* Castlereagh (N. Ireland) Letchworth (Herts.) Croydon (Surrey), and Manchester	Largest British manufacturer of electronic computers and data processing equipment	Mechanical Electro-mechanical Electronic Electronic Mathematics Mechanical Electrical Applied Physics	*15½–17½ Craft or Technician Apprenticeship (need not have 'O' level)* Five-year course; two years at Company training school followed by classification into craft or technician apprentice. Further studies lead either to City and Guilds or O.N.C. and H.N.C. *17½–19 'A' level* Thin sandwich course at university or technical college or 1:3:1 thick sandwich university course for honours degree. Applicants obtain own university or college places. A pre-university course is available for those leaving school in December	Craft or Technician applicants should live within working distance of one of Company's training schools G Sch P Lodging allowance payable plus up to £100 p.a. while at university or college Intake variable Closing date for applications is 31st January but applicants for pre-university course should apply in the summer before they plan to leave school
Johnson, Matthey & Co. Ltd, 78 Hatton Garden, London EC1 (Applications to: Assistant Staff Manager) *Also at:* Wembley (Research), Royston, Brimsdown, Enfield, Shepherd's Bush, Harlow, Burslem, Staffs.	Refining of precious and rare metals; high purity inorganic chemicals; high precision engineering products in precious and rare metals and their alloys	Chemistry Metallurgy Mechanical Production	*Up to 23: Chemists and Metallurgists, 'A' level* Day release for Grad. R.I.C. and A.I.M. respectively, through H.N.C. course *Under 19: Engineers, 'A' level* Four-year thin sandwich course for B.Tech. at Brunel University or B.Sc. at City University	4 science and 4 engineering Students p.a. Sch
A. A. Jones & Shipman Ltd, P.O. Box 89, Narborough Road South, Leicester LE3 2LF (Applications to: The Personnel and Training Officer)	Machine tools (precision grinding and honing machinery)	Mechanical Production	*16–17 'O' level Technician Apprenticeship* Day release for City and Guilds Technician's Certificate or O.N.C. and H.N.C. May be upgraded on attainment of good O.N.C. *18–19 'A' level Student Apprenticeship* Thin sandwich course for honours or ordinary degree in engineering. Applicants should have been offered at least one university or polytechnic place. No 1:3:1 courses	G Sch 5 Technicians p.a. 2 Students p.a.

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
George Kent Ltd, Luton, Beds. (Applications to: Education and Training Officer)	Industrial measuring instruments and automatic control equipment	Electronic Instrument	*16–17½ 'O' level* Day release for O.N.C. and H.N.C. or preparation for degree or H.N.D. course *17–19 'A' level* Sandwich course for degree in Instrument and Control Engineering at City University, which must be included among U.C.C.A. choices. Alternatively, sandwich course for H.N.D. in Electrical and Electronic Eng. or 1:3:1 university course with free choice of college	G (2 year) Applications should preferably be in by the first week in April P
Kodak Ltd, Kodak House, Hemel Hempstead, Herts (Applications to: Personnel Manager, Kodak Ltd, Harrow, Middlesex HA1 4TY for Engineering training and to: Scholarship Co-ordinator, Kodak Ltd, Harrow, Middlesex HA1 4TY for Science training) *Works at* Harrow, Hemel Hempstead, Stevenage and Kirkby *Note:* For pre-university employment (see end column) apply to Personnel Manager (Research) at Harrow	Photographic materials and equipment	(a) Trade Apprenticeship: Mechanical Electrical Instrumentation Building (b) Student Technician: Electrical Electronics Mechanical (c) Student Graduate Engineer: Mechanical Production Environmental Process Control Electrical/ Electronic Chemical Eng. (d) Science Student: Chemistry Physics	(a) *Up to 17·2 'O' levels or C.S.E. 1, 2 or 3* Day release to study for City and Guilds qualifications (b) *16 'O' level* Block release for appropriate H.N.C. (c) *17 'A' level* Thin sandwich course in various branches depending on current requirements – Kodak makes annual announcement of type of training available. Student has free choice of college, preferably within area (d) *17 'A' level* Up to a day and a half release for H.N.C., or thin sandwich course for degree at college of student's choice, preferably within area	Apply before 15th April Sch G P – one year or nine months as research assistant in chemistry or physics before university, not part of sandwich course About 10 sandwich students p.a.
John Laing & Son Ltd, London NW7 (Applications to: Education Officer) Location of employment may be anywhere in Great Britain	Building and engineering contractors	Architecture* Civil Eng.* Building Quantity Surveying Plant Engineering * at Technician level only	*16–17 'O' level: Draughtsmen and Technicians* Day or block release for O.N.C. in Construction or Engineering, and H.N.C. in Building, Architecture or Civil Eng., leading to M.Soc. of Architectural and Associated Technicians, or Civil Engineering Technician's Certificate or Inst. of Building Technicians' Certificate or Lic. of Inst. of Building	G (about 35 p.a.) Sch (about 20 sponsored students p.a.) P– not tied to sandwich course – up to 6 boys p.a. can be offered pre-university work as assistants to Civil Engineers on construction sites

(*Continued on page 35*)

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
John Laing & Son Ltd – *continued*			*16–19½ 'O' level, 'A' preferred* To train as production controllers, supply officers, estimators, site engineers; day or block release for O.N.C. in Construction and H.N.C. in Building followed by Assoc. of Inst. of Building *17–19½ 'A' level* Day or block release for course leading direct to Assoc. of Inst. of Quantity Surveyors *17–19½ 'A' level* Sandwich course for honours degree in Building (which can have specialisation in Environmental Engineering), Quantity Surveying or Mech. Eng. leading to Assoc. of Inst. of Building or Qty. Surveyors or M.I.Mech.E. *Note:* No 1:3:1 courses	Degree candidates should apply as early as possible in final school year Students make own choice of university or college
Laurence, Scott and Electromotors Ltd, Norwich	Rotating electrical machines and control gear	Electrical Mechanical Mechanical/ Production	*16–17 'O' level* Day release for O.N.C. and H.N.C. at Norwich City College *17–18½ 'A' level* Thin sandwich course for H.N.D. or degree, with own choice of college, but no 1:3:1 students	G Sch Closing date 31st May each year About 12 p.a.
R. A. Lister & Co. Ltd, Dursley, Glos. (Applications to: The Training Officer)	Stationary diesel engines. Marine propulsion engines. Diesel electric generating plants. Marine auxiliary electric generating plants. Agricultural machines	Electrical Mechanical	*16 or over, usually 'O' level, some 'A' level candidates considered* 'O' level entrants have day release for O.N.C. and H.N.C. and on getting a good pass in O.N.C. can qualify for B.Sc. or H.N.D. thin sandwich course. 'A' level entrants must spend a year in the training centre before being sponsored for sandwich degree course	H No closing date; training starts in September About 3 p.a. Sch P
London Transport Executive 55 Broadway, London SW1 (Applications to: Appointments and Welfare Officer)	Public passenger transport service	CIVIL (a) General – Drawing office work on specifications and contract preparation, and outside work taking measurements, surveying, setting out, etc (b) Heating and Ventilating – Design and installation of all equipment in road and rail	*17–19 'A' level* Sandwich course for degree in Civil Eng. at any appropriate university or college in London *16–18 'O' level* Day release for recognised technical qualifications, normally O.N.C. and H.N.C.	G Sch (see section 3) Technician students in all branches can, if they gain a good O.N.C., be considered for transfer to a sandwich course for a degree

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1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
London Transport Executive – *continued*		buildings and tunnels (c) Permanent way, design layout, installation and maintenance of railway track		Those applying for sandwich courses at university should include that university in their U.C.C.A. choices 3 Civil 3 Electrical and 3 Mech. Eng. degree places each year; rather larger numbers of technician vacancies Apply for preliminary interview early in last year at school No 1:3:1 courses
		ELECTRICAL (a) Railway Rolling Stock – Design, development and servicing of electric traction equipment (b) Railway Signals and Telecommunications – Design, installation and maintenance of signalling and associated electronic equipment	*17–19 'A' level* Sandwich course for degree in Electrical Eng. at any appropriate university or college in London *17–19 'A' level* Sandwich course for C.N.A.A. degree in Electrical Eng. at the Polytechnic of the South Bank	
		(c) Railway Rolling Stock – Training in draughtmanship and engineering design (d) Electric power generation and distribution, and maintenance of generating stations and sub-stations	*16–18 'O' level* Day release for recognised technical qualifications, normally O.N.C. and H.N.C.	
		MECHANICAL Railway Rolling Stock – Design and development of new railway rolling stock and associated equipment and servicing at works and depots; training in draughtmanship and engineering design	*17–19 'A' level* Sandwich course for degree in Mechanical Eng. at any appropriate university or college in London *16–18 'O' level* Day release for recognised technical qualifications, normally O.N.C. and H.N.C.	

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Joseph Lucas Ltd, Great King Street, Birmingham 19 (Applications to: Director of Education and Training) *See also* C.A.V. Ltd	Light engineering products for the motor vehicle, aircraft and other industries	Mechanical Electrical Electronic Production Physics Mathematics	*School-leaving age:* '*A*' *level* Thin sandwich course for degree at technological university, or 1:3:1 degree course. Occasionally, sandwich course for H.N.D.	G P Sch About 30 p.a.
Sir Robert McAlpine & Sons Ltd, 40 Bernard Street, London WC1 For work on construction sites in England, Wales and Scotland	Civil engineering and building	Civil Building Mechanical	*About 18* '*A*' *level* Degree or H.N.D. courses, either full-time or sandwich; applicants should have obtained a provisional place at a university or polytechnic	G P Sch
The Marley Tile Co. Ltd, Riverhead, Sevenoaks, Kent (Applications to: The Staff Executive)	Largest manufacturers of roof and floor tiles in UK; acoustic materials, plastics, pre-cast concrete structures, moulded foam products for motor industry	Production Mechanical Chemistry	*18–20* '*A*' *level (for Engineering)* Thin sandwich degree course at Brunel or Loughborough, one of which should be included among U.C.C.A. choices *16–19* '*O*' *or* '*A*' *level for Chemistry* Day release for O.N.C., H.N.C. and Grad R.I.C. ('A' level candidates can qualify for direct entry to H.N.C.)	*Engineering* Sch 6 p.a. *Chemistry* Candidates should live within travelling distance 4 p.a.
Marshall-Fowler Ltd, Britannia Works, Gainsborough, Lincs. (Applications to: Personnel Manager	Road rollers, tractors, excavators, boilers, tea machinery, castings, etc	Mechanical Production	*16–17* '*O*' *level* Day release for O.N.C. and H.N.C. High attainment in O.N.C. may lead to sandwich course for degree *18* '*A*' *level* After probationary period in Works the student may be nominated for a sandwich course for degree	About 6 Technician vacancies p.a. Not more than 1–2 Students Sch
Mather & Platt Ltd, Park Works, Manchester M10 6BA *Works at:* Manchester, Radcliffe, Preston, Glasgow (Applications to: Education and Training Director at Park Works)	Textile finishing machinery, electric motors, centrifugal pumps installed and portable fire fighting equipment, food canning and deep-freeze machinery, packaging machinery and pipe fabrication work	Mechanical Electrical Hydraulic Fire Protection Production	*16–17* '*O*' *level* Day and block release for O.N.C. and H.N.C. *17–19* '*A*' *level* Thin sandwich course for H.N.D. or degree or 1:3:1 degree course	Age limits are flexible G P Sch Apply in February or March each year Knowledge of European languages an asset
Mawdsley's Ltd, Dursley, Glos. (Applications to: Personnel and Training Officer)	Rotating electrical machinery, motors, generators, alternators, control gear, static equipment and electronic instruments	Electrical Mechanical Production Control	*16–17* '*O*' *level Technician* Day release for O.N.C. and H.N.C. or two-year O.N.D. sandwich course *17–18* '*A*' *level Student* Thin and 1:3:1 sandwich degree courses, thin sandwich H.N.D. courses. Own choice of college or university, with slight preference for those nearest, e.g. Bath, Bristol, Cardiff	6 or more technicians p.a. G P Sch (permitted supplement to L.E.A. grant plus half textbooks, and N.H.I.) About 4 p.a.

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
May & Baker Ltd, Dagenham, Essex RM10 7XS (Applications to: The Personnel Officer) *Also at:* Ongar Research Station, Norwich	Pharmaceutical, photographic, agricultural, veterinary and industrial chemicals	Chemistry Biology	*16–18 'O' level for Laboratory Assistant, 'A' level for Laboratory Technician* According to qualifications, day release for City and Guilds Chemical Technicians' Certificate, O.N.C. in Science, H.N.C. in Chemistry or Biology, leading to Grad R.I.C. or M.I.Biol. A few take degrees by day release	Intake variable G P – temporary employment before university in chemical analysis or simple organic preparation and investigation
Medical Research Council, 20 Park Crescent, London W1N 4AL (Applications to: The Personnel Officer at above address or at: National Institute for Medical Research, The Ridgeway, Mill Hill, London NW7) There are research units throughout the country	Medical research	Chemistry Physics Biology	*Under 20 'O' level Junior Technician, two 'A' levels for Junior Technical Officer* Day release for Ext.B.Sc., Grad R.I.C., H.N.C. or equivalent qualifications	G Sch for selected members of staff (see section 3) After qualification, students are considered for promotion to higher grades
The Metal Box Co. Ltd, 37 Baker Street, London W1A 1AN (Applications to: Head of Staff Recruitment Division) *Factories at:* London*†, Arbroath, Carlisle, Crawley, Hull, Leicester, Liverpool*†, Manchester, Mansfield, Neath, Portadown (N.I.), Portslade*, Portsmouth*, Poole, Rochester, Shipley, Swindon*, Westhoughton, Wisbech, Worcester, Sutton-in-Ashfield, Glasgow, Timperley, Winsford, Wrexham, Bromborough * train Plastics Technologists † train Printing Technologists (also trained in other areas) Engineering training in most areas	Metal, paper board and plastic containers and closures, domestic hardware, polythene wrapping and packaging machinery	Mechanical Production Electrical Plastics Technology Printing Technology	*About 18, 'A' level* Sandwich course for degree at either Brunel or Loughborough Universities (one to be included among U.C.C.A. choices) or 1:3:1 degree course at university of student's own choice *About 18, 'A' level* Sandwich course at the Polytechnic of the South Bank for degree in Chemical Technology and Associateship of the Plastics Institute; *or* sandwich course at Watford College of Technology leading to a degree in Printing Technology	G P Sch About 8 thin sandwich engineering trainees p.a. and 5 for 1:3:1 courses 1 Plastics trainee and 2 Printing trainees p.a. Apply as soon as possible after 1st October and not later than following 1st April
Metal Industries Ltd, Seymour Mews House, Wigmore Street, London W1H 0BS (Applications to: Group Personnel Officer)	Head Office only – co-ordinating agency for firms below	*See below*	*See below*	G Sch

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Metal Industries Ltd – *continued* **Brookhirst Igranic Ltd,** Elstow Road, Bedford	Electric motor controls and switchgear	Electrical Mechanical Production	*Up to 19 'A' level* Thin sandwich course for B.Sc. at technological universities, e.g. Bath and City, and polytechnics	2 p.a. average
Dynamo and Motor Repairs Ltd, North End Road, Wembley, Middlesex	Electrical repairs	Electrical		Occasional intake only
Foster Transformers Ltd, Morden Road, London SW19	Electrical transformers, regulators, rectifiers and test equipment	Electrical		1 p.a. average
Thorn Automation Ltd, Rugeley, Staffs.	Industrial electronics	Electrical Electronic Production		5 p.a. average
Towler Hydraulics Ltd, Rodley, Nr. Leeds	Hydraulic pumps, motor rams, valves and control gear	Mechanical Production		1 p.a. average P – not tied to sandwich course; a few school-leavers taken each year before university for temporary work
Michelin Tyre Co. Ltd, Stoke-on-Trent, Staffs. (Applications to: Recruitment Manager) Apprentice training at Stoke-on-Trent, Ballymena, Burnley, and Dundee	Vehicle tyres and tubes	Mechanical Electrical Rubber Technology Mechanical Electrical Industrial Chemistry Polymer Science	*15¾–18 Technician Apprentice* Day release for O.N.C. and H.N.C. or City and Guilds Full Technological Certificate *17–19½ Student Apprentice* Honours degree on 1:3:1 or thin sandwich basis, or H.N.D. A list of the Company's preferred universities and colleges will be found in section 3	Sch (see section 3) G P Early application advisable, preferably but not exclusively by 15th December No. of vacancies varies
Ministry of Defence (a) Student Apprenticeships or (b) Student Engineer appointments at Research and Development Establishments and Royal Ordnance Factories (Applications to: The Industrial Training Officer CM(Ind)1c, Ministry of Defence, Room 302, Sentinel House, Southampton Row, London WC1B 4AX)	Research, development, manufacture and maintenance of equipment for the Services	(a) Electrical Electronic Mechanical Aeronautical Chemical (b) Civil Electronic Electrical Production Mechanical Metallurgy	*16–19 on 1st September, 'O' level* Day release for O.N.C., H.N.C. or City & Guilds Final Certificates. Opportunity exists for selected students to pursue sandwich courses leading to degrees or H.N.D. in Engineering *Under 20 on 1st September, 'A' level* Sponsored sandwich and full-time courses leading to degrees	Closing date about end February each year G P Sch (see section 3)
Ministry of Defence (Navy Department): Royal Naval Engineering Service (Schools Entry)	Design and development of systems, machinery and equipment used in (*Continued on page 40*)	Mechanical Electrical **50**	*Not more than 19½, three 'A' levels* Entrants are trained at the Royal Naval Engineering College, Manadon, Plymouth, undergoing, during their	G Sch (Full support) Application by the end of June

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Ministry of Defence (Navy Department) – *continued* (Applications to: Civil Service Commission, Alencon Link, Basingstoke, Hants.)	warships; organising and controlling installation projects in ships under construction; planning, organising and managing refit facilities in HM Dockyards		first year academic, practical, and workshop training in mechanical and electrical engineering subjects and their applications to naval purposes. They then read for an honours degree in mechanical or electrical engineering. There is some training during vacations, including visits to firms and naval establishments. Students are expected to obtain a 1st or upper 2nd Class honours degree. After obtaining their degree, they receive further training at naval establishments and at sea before taking up appointment as professional electrical or mechanical engineer	
Ministry of Defence (Navy Department), Probationers in the Royal Corps of Naval Constructors *Training* at R.N. Engineering College, Manadon, and University College, London (Applications to: Ministry of Defence (Navy Department), Civilian Management (Specialists), Empire Hotel, Bath)	Design, production and maintenance of ships of the Royal Navy	Naval Architecture	*Not more than 19½ on 1st September, 'A' level* One-year course at R.N. Engineering College, Manadon, with instruction in ship construction, shipyard practice and theoretical naval architecture at the Constructors' Training Office, HM Dockyard, Devonport, followed by a three-year undergraduate course at University College, London, working for a B.Sc. Students who gain a 1st, 2nd or 3rd class honours degree then undertake a postgraduate year for a M.Sc. degree. Probationers are then appointed Assistant Constructors in the R.C.N.C.; thereafter they undergo a further year's training at sea. All members of the R.C.N.C. are civilian officers, liable to serve at sea or at any establishment at home or abroad. Assistant Constructors, after they leave U.C.L. and have acquired practical experience, may make application for membership of the Institution of Naval Architects	Applications by mid-May Sch (Full support)
Ministry of Defence (Navy Department), Technician Apprenticeships in the Royal Dockyards at Chatham, Devonport, Portsmouth and Rosyth (Applications to: Personnel Manager of one of the Royal Dockyards listed above)	Fitting and repair of ships	Mechanical Electrical Naval Architecture	*Under 18 on 1st September, 'O' level* 16 hours a week attendance (day release) at technical colleges, leading to O.N.C. in Engineering or Naval Architecture, followed by courses leading to H.N.C. in Electrical Engineering, Mechanical Engineering, or Naval Architecture. On completion of training qualified technician apprentices are offered permanent non-industrial appointments as Draughtsmen or Technical Officers Grade III: may be selected for training to honours degree standard with a view to becoming Naval Constructors or professional mechanical and electrical engineers	Those with less than the four required 'O' levels take an examination in Mathematics, Science and English, held each Spring Interviews in May/June/July each year Sch H – Rosyth only

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Mirrlees Blackstone Ltd, Hazel Grove, Stockport, Cheshire SK7 5AH (Applications to: The Training Officer) A Hawker Siddeley Company	Diesel engines	Mechanical Production Computer Science	*Up to 17 'O' level* Day or block release for O.N.C. and H.N.C. with opportunity to transfer to sandwich course for H.N.D. or degree *Up to 19 'A' level* Thin sandwich degree course at University of Salford. No 1:3:1 courses	G Sch Applications by 31st March
Mullard Ltd, Central Personnel Department, Berkshire House, High Holborn, London WC1V 7AQ (Applications to: Technical Training Adviser) *Training at:* Mitcham, Surrey; Southampton, Blackburn, Crossens and Simonstone, Lancs., Thornaby, Teesside	Valves, photo-cells, cathode ray tubes, semi-conductor devices, magnetic and electronic components, information storage devices, tuners	Electrical Mechanical Production Electronic Physics Chemistry	*16–17 'O' level* Day and block release for O.N.C. and H.N.C. *18–19 'A' level* Day release in some cases or sandwich course for H.N.D. or degree *16–18 'O' or 'A' level* Day release for H.N.C., Grad. R.I.C., Grad. Inst.P.	G P Sch (at Mitcham) Closing date end May at Mitcham, Southampton mid-April About 10 p.a. for engineering and 8 for science
National Coal Board, Hobart House, Grosvenor Place, London SW1 (Applications to: Head of Recruitment, Education and Training Staff Department) Training in mining areas	Coal, premium and smokeless fuel, coke, by-products and bricks	Mining Mechanical Electrical Mining Mechanical Electrical Chemical Eng.	*Normally not over 18, but may be older – 'O' level* Day release to O.N.C. level followed by sandwich courses for H.N.D. or C.N.A.A. degree, or day release for H.N.C. according to standard reached *18–25 'A' level* Full-time or sandwich honours degree course on full or supplementary scholarship	No. of vacancies variable Applications should be received in the early months of the year Lodging allowance available G Sch (see section 3) P
Norris Warming Co. Ltd, Burley House, Theobald's Road, London WC1 *Branches at:* Ipswich, Manchester, Newcastle, Bristol (Applications to: Personnel Offi[illegible]	Design and installation; heating, ventilating and air conditioning	Mechanical then Heating and Ventilating	*16–18 'O' level* Day release for O.N.C. then 18 months sandwich course for Diploma at Polytechnic of the South Bank: and finally Associate Membership of Institution of Heating and Ventilating Engineers	Closing date July H 10 p.a.
North Thames Gas Board, 30 Kensington Church Street, London W8 (Applications to: The Staff Controller)	Natural gas	Civil Mechanical	*18 upwards 'A' level* Sandwich training for degree, usually thin sandwich at Brunel, City University or other colleges in London area; 1:3:1 courses considered	1 or 2 p.a. G Sch

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
North Western Gas Board, Welman House, Altrincham, Cheshire (Applications to: Chief Training Officer) *Training* in towns throughout the North West	Gas	Gas Engineering, specialising in Distribution or Industrial Gas Engineering	*16–19 'O' level or 'A' level Technician Apprenticeship* Block release for Inst. of Gas Engineers Advanced Certificate for Senior Gas Engineering Technicians, at Stretford Technical College. Up to four Technicians selected each year for honours degree course in Gas Engineering at University of Salford	G Sch (full support and fees) Industrial training available for college or university-based students
C. A. Parsons & Co. Ltd, Heaton Works, Newcastle-upon-Tyne 6 A member of the Reyrolle Parsons Group (Applications to: Training Manager)	Steam turbines, alternators, and power plant auxiliary equipment	Mechanical Electrical	*16½ 'O' level* Day or block release for O.N.C. and H.N.C. *17–18½ 'A' level* Thin or 1:3:1 sandwich course for B.Sc. at universities or polytechnics of student's choice, also 3:2 university courses	 G (20 p.a.) Sch P – usually part of 1:3:1 scheme but exceptions may be made for other pre-university school-leavers wanting works experience 6 students p.a.
Parsons Peebles Ltd, East Pilton, Edinburgh EH5 2XT (Applications to: Chief of Engineering Training)	Medium and heavy transformers, motors and generators	Electrical Mechanical Production	*16½–18 S.C.E. 'O' grades* Day release for O.N.C. and H.N.C. or City and Guilds Electrical or Mechanical Technician's Certificate. Own technical apprentices sometimes supported on H.N.D. or degree sandwich courses in electrical, mechanical or production engineering	G P – not tied to sandwich course: basic workshop experience between school and university, often via Scottish Electrical Training Scheme (see section 2) 2–4 p.a. Applicants resident in Edinburgh preferred
P & O Lines Ltd, Beaufort House, St Botolph Street, London EC3A 7DX	Shipping	Marine (sea-going)	*16–18 'O' level* Four year Cadetship on Agreement; first two years on full-time O.N.D. course at a college of technology; 18 months at sea; then a further year's study at college in workshop theory and practice. On completion, Cadets serve 18–21 months as Junior Engineer Officers before taking examination for Second Class Certificate of Competency, for which O.N.D. gives certain exemptions (*Continued on page 43*)	H

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
P & O Lines Ltd – *continued*			*18–19½ 'A' level* Three-and-a-half year H.N.D. Cadetship on Agreement: Year 1: 2 terms academic, 1 term workshop training. Year 2: 2 terms academic, 1 term seagoing. Year 3: 2 terms academic, take H.N.D. finals. 6 months seagoing or industrial project. H.N.D. grants exemption from C.E.I. Part 1 and First and Second Class Certificates of Competency	
Perkins Engine Group, Peterborough (Applications to: The Technical Training Manager)	High speed diesel engines	Mechanical Production Metallurgy	*16–17 'O' level Student Technician* Day release for O.N.C. and H.N.C. *18 'A' level Student Engineer or Metallurgist* Thin or 1:3:1 sandwich course for degree in Engineering or thin sandwich course for degree in Metallurgy. Thin sandwich courses are normally at Loughborough University, which should be included among U.C.C.A. choices	G P Sch Candidates accepted subject to reaching qualifications in their examinations
Permali Ltd, Bristol Road, Gloucester GL1 5SU (Applications to: Training Manager)	Cellulose and fibreglass-based laminates for electrical and mechanical applications. Cast resins. H.V. bakelised paper bushings (indoor and outdoor). Polytetrafluoro-ethylene components	Electrical Mechanical Plastics Technology Industrial Chemistry Production	*Up to 20 'A' level* Sandwich course for H.N.D. or B.Sc. at technological university	Sch Recruitment normally limited to local candidates
Pfizer Ltd, Richborough, Sandwich, Kent (Applications to: Development and Training Manager)	Pharmaceutical, veterinary, agricultural, fine chemicals, vaccines, dietary foods	Chemistry Biochemistry Microbiology Pharmacology Parasitology	*16–18 with 'O' level, 17–19 with 'A' level, Laboratory Technician* Day release for O.N.C. (with 'O' level) or H.N.C. (with 'A' level). O.N.C. is in Science or Applied Biology, and H.N.C. in Chemistry or Applied Biology. Can continue studies to Grad. R.I.C., L.I.Biol. etc	G Applications preferably before Easter. Most vacancies occur in the Research Division P – gap-filling employment, mainly for Oxbridge scholars, in Research laboratories
Pilkington Brothers Ltd, St Helens, Lancashire (Applications to: Recruitment Officer) *Works at:* St Helens, Glasgow, Birmingham, Doncaster, Pontypool, Queenborough, St Asaph	Sheet, flat and rolled glass; pressed glassware for industrial use; armourplate; optical glass, decorative panels: cathode ray tubes for television	Mechanical Electrical Applied Physics	*Up to 19 'A' level* Student engineers take thick or thin sandwich courses for B.Sc. at university or polytechnic of their choice. Applied Physics students take thin sandwich course at university or polytechnic of their choice	G P H 5 p.a. approx.

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Platt International Ltd, Holcombe Road, Helmshore, Rossendale BB4 4NG (Applications to: Training Officer) *Also at:* Accrington, Bolton, Oldham	Cotton, woollen, worsted and synthetic processing machinery, general engineering	Mechanical Production Engineering Science	*Age limits flexible: 'A' level* Full-time (1:3:1) or thin sandwich for degree courses, or sandwich courses for H.N.D. Those taking thin sandwich for degree should name University of Salford among U.C.C.A. choices. Own choice of university for 1:3:1 students	G P Sch (see section 3) 10 p.a.
The Plessey Co. Ltd, *Dynamics Group* *Works at:* Titchfield, Romford, Swindon, Enfield (Applications to: Group Training Manager, Plessey Dynamics Group, Titchfield, Fareham, Hants.) *Telecommunications Group* *Works at:* Liverpool, Nottingham, Sunderland, Wigan, and *Research establishments* at P.T.R., Taplow Court, Maidenhead (Applications to: Group Training Manager, Plessey Telecommunications Ltd, Edge Lane, Liverpool) *Electronics Group* *Works at:* Ilford, Surrey, S. Hampshire, Poole, Wincanton, Essex, I.O.W., W. Drayton, Alexandria, Scotland: *Research* at Wincanton and Romsey (Hants.) (Applications to: Group Training Manager, Plessey Electronics Group, Surrey House, Temple Place, London WC2) *Components Group* *Works at:* Swindon, Ilford, Titchfield, Towcester, Chessington, Northampton, Liversedge, Bathgate (Scotland) and *Allan Clark Research Centre*, Northampton (Applications to: Group Training Manager, Plessey Components Group, Kembrey Street, Swindon, Wilts.)	Systems equipment and components for the aerospace industry. Equipment and components for industrial hydraulics – particularly off road vehicles International, national and private telephone networks and total range of communications systems A.T.C. Systems and radar, radio communications, transmission, processing and presentation of data, instrumentation for meteorology and oceanology. Machine tool control. Traffic systems Discrete and passive components for professional and entertainment electronics; micro electronics; memories	Aeronautical (Dynamics Group only) Communications Electrical Electronic Telecommunications Production Mechanical Industrial Instrument and Control Mathematics Physics Chemistry Metallurgy	*16–17 'O' level, Technician* Day or block release for City and Guilds Certificate or O.N.C. and H.N.C., with possible transfer to sandwich course after O.N.C. stage *17–19 'A' level* Sandwich course for H.N.D. or degree, or 1:3:1 university course	G P Sch About 50 p.a.
Post Office (Full Details from: Post Office Appointments Centre, Euston Tower, 286 Euston Road, London NW1 3DD)	Telecommunications Engineering	*Studentship* Electrical Electronic Eng. Mechanical Physics Electronics	*17–20 'A' level Mathematics and Science subjects (min. three)* Training within the Post Office for one year followed by a full-time university degree course	G P Apply by 31st October

(*Continued on page 45*)

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx, no. of vacancies p.a.
Post Office – *continued*		Computer Science Mathematics *Assistant Executive Engineer* Electrical Electronic Mechanical	 *17½–27 'A' level Physics and Mathematics* Bursaries and thin sandwich courses for degree In both schemes, student makes own choice of college	Sch (see section 3) Continuous recruitment programme
Powell Duffryn Group, Enquiries should be sent to Personnel Officer, Group Personnel Department, Powell Duffryn Ltd, Powell Duffryn House, 8 Great Tower Street, London EC3R 5AE	Main interests throughout UK and overseas are in engineering, shipping, heating and air treatment, fuel distribution, oil and chemical storage, wharfage and transport, timber and quarrying	*No information available at time of going to press* but see separate entries for Andrews-Weatherfoil Ltd and Hamworthy Engineering Ltd		
Priestman Bros. Ltd, Hedon Road, Hull (Applications to: Personnel Manager)	Excavators, grabs, grab dredgers	Mechanical	*16–17 'O' level* Day release for O.N.C. and H.N.C. at Hull College of Technology. Some selected for H.N.D. sandwich course at Hull after O.N.C. stage	Closing date 30th June
Pye-T.M.C. Ltd, Hollingsworth Works, Martell, West Dulwich, SE21 (Applications to: Personnel Officer) *Works also at:* St Mary Cray, Kent	Telecommunication equipment for G.P.O. and export	Electrical Mechanical Telecommunications	*16–17 'O' level* Day release for O.N.C. *16–18 'A' level* Thin sandwich courses for H.N.D. or degree at student's own choice of college or university. No 1:3:1 students	Closing date end August G Sch About 4 technicians and 4 students p.a.
Pye Unicam Ltd, York Street, Cambridge (Applications to: Personnel Manager)	Scientific Instruments	Production Electronics Instrument Technology Design Chemistry Applied Physics	*18–19 'A' level* Thin sandwich course at technological university or polytechnic for degree or H.N.D. Students should ask firm's advice about preferred colleges before putting in U.C.C.A. applications or approaching polytechnics. No 1:3:1 courses. Student chemists may start by day release course for G.R.I.C., or sandwich course for H.N.D. or degree	3 p.a. for Engineering 1 p.a. for Chemistry 1 p.a. for Physics G Sch

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
The Pyrene Co. Ltd, Pyrene House, Sunbury-on-Thames, Middlesex (Applications to: The Personnel Manager) *Other locations at:* Iver, Feltham and Ferndale	Fire protection equipment, fire extinguishers, fire fighting vehicles, metal finishing processes, fire detection and security apparatus	Mechanical Electrical Chemistry Metallurgy	*Under 18 for Engineering, under 21 for Science, 'O' level* Day release for O.N.C. or City and Guilds Certificate	G (2-year) Applications before end of April
Raleigh Industries Ltd, Nottingham (Applications to: Training Officer) A member of the T.I. Group	Bicycles and accessories, toys and prams, car seats, office furniture	Mechanical Production	*16–17½ 'O' level* Day or block release for O.N.C. and H.N.C. *17–19 Student Apprenticeship 'A' level* Thin sandwich course for H.N.D. or degree, or 1:3:1 degree course; own choice of college or university	G P Sch 3 or 4 Students p.a.
Ransome Hoffmann Pollard Ltd, P.O. Box 18, Newark, Notts. (Applications to: Chief Education and Training Officer)	Ball and roller bearings	Mechanical Production	*'O' level, under 18 on 1st September* Day release for O.N.C. leading to H.N.D. or degree course *'A' level, age limit flexible* Thin sandwich course at technological university or polytechnic for degree; own choice of college but preferably within reasonable distance, e.g. Loughborough University or Trent Polytechnic	G 4 p.a. Sch No closing date
Ransomes, Sims & Jefferies Ltd, Ipswich, IP3 9QG (Applications to: Training Officer)	Farm machinery, grass machinery, electric trucks	Mechanical Electrical Production Agricultural	*17–18 'A' level* Thin sandwich course leading to H.N.D. or degree, usually B.Tech. at Brunel University. Occasionally full-time C.N.A.A. degree course at National College of Agricultural Engineering	G Sch 1–2 p.a. Closing date 30th April each year
Reed International Ltd, Larkfield, Nr. Maidstone, Kent (Applications to: Senior Education Officer) Place of work is normally at Larkfield, but occasionally at other centres in the UK	Paper and board manufacturers and converters	Mechanical Electrical Chemistry Chemical Eng. Physics Applied Physics Paper Science	*Engineering Students* *18–20 'A' level* Thin or 1:3:1 sandwich course for degrees or H.N D. with free choice of university or polytechnic *Science Students* *16–18 'O' level, 18–20 'A' level* Day release for O.N C. and H.N.C. Chemistry or Applied Physics, leading to Grad. R.I.C. or Grad. Inst.P. For Paper Science, full-time sponsored B.Sc. at Manchester University	G Sch (supplement to grant, but may be extended if circumstances warrant)

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Renold Ltd, Renold House, Wythenshawe, Manchester M22 5WL (Applications to: Employment Manager)	Precision and positive power transmission products	Mechanical	*16–17 'O' level* Day release for O.N.C. and H.N.C. *17–18 'A' level* Thin sandwich course for B.Sc.Eng. at Universities of Salford, Bradford, or Aston	 G Sch
The Research Association of British Paint, Colour and Varnish Manufacturers, The Paint Research Station, Waldegrave Road, Teddington, Middlesex (Applications to: Deputy Director and Secretary)	Scientific and technological research	Chemistry Physics	*Up to 20, 'A' level Chemistry or Physics* Day release for H.N.C. leading to Grad. R.I.C. or Grad. Inst.P. No sponsored sandwich courses	6 p.a. P – temporary employment before university, with training in chemical, physical and technological techniques
A. Reyrolle & Co. Ltd, Hebburn, Co. Durham (Applications to: The Training Officer)	Electrical switchgear and ancillary apparatus	Electrical Mechanical	*16–17½ 'O' level* Block release for O.N.C. and H.N.C. *18–20 'A' level* Thin and thick (1:3:1 and 3:2) sandwich courses for B.Sc. Student has free choice of college or university	 G P 3–4 p.a. Sch (see section 3 for 1:3:1 full support scholarships – others have L.E.A. grant supplemented)
Rolls-Royce Motors Ltd, Pym's Lane, Crewe, Cheshire CW1 3PL (Applications to: The Training Manager)	Cars, commercial and military engines	Automobile Mechanical Production Chemistry Metallurgy Paint Technology	*16–17½ 'O' level* Day release for O.N.C. and H.N.C. *18 'A' level* Thin or 1:3:1 sandwich course for degree, or thin sandwich for H.N.D. Where appropriate prefer local establishments, e.g. North Staffordshire Polytechnic *16–17½ 'O' level, 17½ 'A' level* Day release for O.N.C. and/or H.N.C., possibly followed by Grad.R.I.C.	G P H Closing date 30th June About 5 Student Engineers p.a. 2 Science trainees p.a.
Rosser & Russell (London) Ltd, Queen's Wharf, Queen Caroline Street, London W5 (Applications to: D. A. Russell, Director) *Also* **Rosser & Russell (Northern) Ltd,** Sylvester House, 67 Upper Accommodation Road, Leeds LS9 8NA	Design and installation of heating, ventilating and air-conditioning systems and other mechanical services for every type of building	Heating, ventilating and air-conditioning Environmental Eng.	*16–18 'O' level for Senior Technician, 'A' level for Technologist* Four/five year apprenticeship for senior technicians includes day release for O.N.C. and two-year sandwich Diploma course in heating and ventilation. Technologist course includes four-year sandwich degree in Environmental Engineering. Both courses are at the Polytechnic of the South Bank, London	Applications at any time during year but normal starting date September G P Sch About 9 p.a.

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Ruston-Bucyrus Ltd, P.O. Box 14, Lincoln (Applications to: Chief Training Officer)	Excavator and crane manufacturers	Mechanical Production	*17–19 'A' level* Thin sandwich course for degree or H.N.D. at university or college of student's choice with slight preference for Trent Polytechnic	G (1 p.a.) 2 Students p.a. P – can offer 'gap-filling' pre-university workshop training, not tied to sandwich course
Shell Research Ltd, **Shell Centre,** London SE1 (Applications should be made direct to the appropriate Laboratory)				G P – 9–12 months pre-university employment; no sandwich courses. (No pre-university work at Carrington Plastics)
For **Thornton Research Centre:** Head of Personnel Division, Shell Research Ltd, P.O. Box 1, Chester	Research and development in fields of petroleum fuels and lubricants	Chemistry Physics Mathematics Mechanical Metallurgy	*17–18 'O' or 'A' level* Day release for O.N.C. and H.N.C.	*Intake:* Variable at Thornton; 10 p.a. for Sittingbourne group; 15–20 p.a. for Egham; 4 p.a. for Carrington Plastics
For **Woodstock Agricultural Research Centre:** Tunstall Laboratory, Milstead Laboratory and Borden Laboratory – Head of Personnel Division, Shell Research Ltd, Sittingbourne, Kent	Pesticide research at Woodstock, toxicological research at Tunstall, fundamental research in chemistry, biochemistry and microbiology at Milstead, and microbiological research at Borden	Chemistry Biology	*17–18 'O' level, 18–20 at least one 'A' level* Day or block release for O.N.C., H.N.C., Grad.R.I.C. or M.Inst. Biol.	
For **Egham Research Laboratories:** Personnel Manager, Shell Research Ltd, P.O. Box 11, Egham, Surrey	Research and technical service in industrial chemistry, resins, petroleum fuels and lubricants	Chemistry Physics Chemical Eng. Mechanical Eng.	*17–18 'O' level, 18–20 'A' level* Day release for O.N.C. and H.N.C.	
For **Carrington Plastics Laboratory:** Head of Personnel Division, Shell Research Ltd, Carrington Plastics Laboratory, Urmston, Manchester M31 4AJ	Research and development and technical service in thermoplastics	Chemistry Physics Mechanical Eng. Chemical Eng. Plastics Technology	*16 'O' level* Day release for O.N.C. and H.N.C.	
Short Brothers & Harland Ltd, P.O. Box 241, Queen's Island, Belfast BT3 9DZ (Applications to: Personnel Manager)	Aircraft, precision instruments, guided weapons and general engineering products	Aeronautical Mechanical Electrical	*18 (occasionally older) 'O' level or 'A' level* Block, day release or sandwich courses for O.N.C. or O.N.D. Sandwich courses for 'A' level entrants for degree or H.N.D. No financial sponsorship	G 75–100 p.a. (includes craft and technician apprentices)

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Simms Motor Units Ltd, Oak Lane, East Finchley, London N2 (Applications to: Assistant Training Officer) Part of the Joseph Lucas Organisation	Fuel injection equipment	Mechanical Production	*16–17 'O' level* Day or block release up to O.N.C. and can then qualify for transfer to thin sandwich for H.N.D. or degree *18–20 'A' level* Thin sandwich course for H.N.D. or degree. Slight preference for colleges in London area	G Sch (wages paid throughout both college and industrial periods) *Intake:* 5 Technicians p.a. 1 or 2 Students p.a.
Smiths Industries Ltd, Bracken Hill House, The Woods, Northwood, Middlesex (Applications to: Chief Education Executive) *Works at:* Cricklewood, Hythe, Barkingside, Cheltenham, Basingstoke, Brighton, Godalming, Rugby, Watford, Witney, Scotland, S. Wales	Motor instruments and accessories, car radios, clocks and watches, aircraft instruments, autopilots and flight systems, industrial instruments and gauges, industrial ceramics, medical equipment, marine instruments, control systems	Mechanical Electrical Electronics Production Instrument and Control Industrial Chemistry	*17–19 'A' level* In most cases the first year is spent in the residential student training centre; then thin sandwich course for degree or H.N.D., or in a few cases 1:3:1 degree course. Student makes own choice of college or university, with slight preference for London area	G (from own training scheme) Sch H in first year About 20 p.a. Apply at any time
South Eastern Gas Board, Katharine Street, Croydon, Surrey CR9 1JU (Applications to: Director of Personnel)	Gas	Gas Engineering and Utilisation	*17 or over, 'A' level* Thin sandwich course leading to honours degree in Gas Engineering at University of Salford, which should be included among U.C.C.A. choices	3 p.a. Sch (full salary and fees throughout)
Thorn Electrical Industries Ltd, Great Cambridge Road, Enfield, Middlesex (Applications to: Group Education and Training Officer) *Also at:* Leicester, Sunderland and other Works	Lamps and lighting, radio and television, electronic devices, domestic appliances	Electrical Electronic Lighting Production Chemical Eng. Applied Physics Chemistry Mathematics	*16–17½ 'O' level* Day or block release for O.N.C. and H.N.C. or other technician's course *17½–19 'A' level* Sandwich courses for degree, H.N.D. and professional qualifications. Students can attend the college or university of their choice. A limited number of 1:3:1 students are accepted	 G (mainly from own training schemes) P Sch (see section 3)
Tube Investments Ltd, Personnel Department, Woodbourne Grange, 21 Woodbourne Road, Birmingham B17 8BZ (Applications to: Personnel Director) *Some TI Companies Birmingham area* Accles & Pollock Ltd, Radiation Ltd, Tubes Ltd, Tube Products Ltd	Steel, steel sheets and tube, bicycles, toys, prams, silencers and tubular furniture, electrical appliances and switchgear, mechanical handling plant, machine tools and gas appliances, aluminium, aluminium sheet, tube and extrusions	Mechanical Production Metallurgical Electrical	*17 or over, 'A' level* Thick or thin sandwich courses for honours degrees at universities and polytechnics of students' own choice. Over half the trainees are Mechanical or Production engineers *Note:* for Technician Apprenticeships, apply to the individual TI companies	G P Sch 50 undergraduate trainees p.a. – 40 on Engineering courses

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Tube Investments Ltd – *continued* *Midland Region* Creda Ltd, Stoke-on-Trent Chesterfield Tube Co. Ltd Raleigh Industries Ltd, Nottingham Fords (Finsbury) Ltd, Bedford Round Oak Steel Works Ltd, Brierley Hill, Staffs. Coventry Gauge & Tool Co. Ltd Weldless Steel Tube Co. Ltd, Wednesfield, Staffs. *Elsewhere:* British Aluminium Co. Ltd with plants in England, Scotland and Wales George King & Co. Ltd, Stevenage				
Unit Construction Co. Ltd, Unit House, Speke Boulevard, Liverpool L24 9LU (Applications to: Training and Safety Manager) A member of the Alfred Booth Group	Construction of all kinds of dwellings from single storey patios to 22-storey blocks of flats, industrial and commercial premises, schools, and civil engineering works	Quantity Surveying Building	*No fixed age limit but below 24, 'O' or 'A' level* Day release, block release and sandwich courses according to entry qualifications. 'A' level entrants take H.N.D. in Building or course for qualifications of Inst. of Quantity Surveyors, or B.Sc.Hons. in Building subjects leading to general or site management. Most students are at University of Aston, but other universities and colleges will be considered. No 1:3:1 courses	No closing date but firm likes to finalise year's intake before July G Sch (see section 3) About 6 p.a.
Vauxhall Motors Ltd, Luton, Beds. LU2 0SY (Applications to: Supervisor – Professional and Commercial Training)	Passenger and commercial vehicle	Automobile Mechanical Production Computer Science	*16–18 'O' level, Technician* Day release for City & Guilds Cert. or O.N.C. sandwich course. Apprentices completing O.N.C. are considered for transfer to H.N.D. sandwich course. *18–19 'A' level, Professional Engineer* (a) Sandwich course for Luton College Associateship giving exemption from C.E.I. Parts 1 and 2. (b) 1:3:1 university course (c) Thin sandwich course at a university or polytechnic. Candidates to obtain own university or college place	Sch (see section 3) Approx. no. of vacancies p.a. 80 Technicians, 30 Students. Closing date 1st December for degree and 1st March for Diploma G
Vosper Thornycroft Ltd, Woolston Works, Southampton	Ships and marine engines	Naval Architecture Electrical Mechanical Marine	*17½–18½ approx., 'A' level* Thin and thick sandwich courses at universities and polytechnics. Student finds own place before applying at college of his choice	6 p.a. G Sch Prefer to recruit from Southern area

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no of vacancies p.a.
Watney Mann Ltd, Watney House, Palace Street, London SW1 (Applications to: Recruitment Officer) *Also in* London SW14 area	Beer and soft drinks	Chemistry Biochemistry Biology Microbiology	*16–17 'O' level, 18–19 'A' level* Day release for O.N.C. or H.N.C. according to qualifications	G 4 p.a.
Weir Pumps Ltd, Alloa Works, Alloa, Clackmannanshire (Applications to: Staff Training Officer)	Large electric motors, centrifugal pumps	Mechanical Production Electrical	*16–18 'O' or 'A' level* 'O' level entrants have day release for O.N.C. and H.N.C. May be upgraded to sandwich course at O.N.C. stage. 'A' level entrants take H.N.D. or thin sandwich degree courses, with free choice of university or college. Company provides vacation training and postgraduate training for full-time university students	G About 6 p.a. Sch
The Wellcome Foundation Ltd, The Wellcome Building, 183-193 Euston Road, London NW1 (Applications to: The Group Training and Education Officer) *Also at:* Dartford, Beckenham, Berkhamsted, Crewe	Pharmaceuticals and fine chemicals; veterinary and pest control products; chemical engineering	Chemistry Mathematics Physics Biology Business Studies	*No age limits for Science trainees* Day or block release for O.N C., H.N.C. in Chemistry or Biology, leading to Grad.R.I.C. or M.I.Biol. *Under 20, good 'A' levels* Thin sandwich course for B.A. (Hons.) Business Studies at City of London Polytechnic. (Company feels that some students with science 'A' levels will be attracted to this course)	G 150 p.a. 6 p.a.
Westinghouse Brake and Signal Co. Ltd, Chippenham, Wiltshire (Applications to: Training Officer)	Semi-conductors, electronic, electrical and pneumatic control systems, railway and road brakes, railway signalling and mining equipment	Electrical Electronic Mechanical Production Physics	*16–18 'O' level Technician Apprenticeship* Day release for O.N.C. and H.N.C. *16–19 'A' level Student Apprenticeship* Thin sandwich course for degree or H.N.D. Preference for City, Aston, Bath or Brunel Universities, or (for H.N.D. only) Leicester or Bristol Polytechnic	 8 Students p.a. Sch G
Westland Aircraft Ltd, Four companies in Group: Westland Helicopters Ltd, Yeovil Division Hayes Division Weston Division British Hovercraft Corporation Ltd, Normalair-Garrett Ltd Westland Engineers Ltd (Applications to: The Apprentice Training Officer, Westland Helicopters Ltd, Yeovil, Somerset	Helicopters, hovercraft, environmental control systems for aircraft, hydraulic control systems, building products. The largest group in Europe and Commonwealth specialising in the design of rotary-wing aircraft and hovercraft	Aeronautical Mechanical Electrical Production Chemistry Metallurgy Mathematics	*16–17½ 'O' level, Technician Apprenticeship* Day release for O.N.C. and H.N.C. in Mechanical Eng. (including Production Eng.) or Electrical Eng., Chemistry or Metallurgy *18–19½ 'A' level, Undergraduate Apprenticeship* Thin or 1:3:1 sandwich course for degree, or thin sandwich for H.N.D. Should have acceptance by university or polytechnic or college of technology H.N.D. students take Mechanical, Electrical, or Production Eng. or Mathematics	G (2-year) Sch (see section 3) P Intake late August or early September. Apply at any time during last school year

1 Studentships in Engineering and Science

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
Westland Aircraft Ltd – *continued* Training Officer, Westland Helicopters Ltd, Hayes, Middlesex The Training Officer, Westland Helicopters Ltd, Oldmixon, Weston-super-Mare, Somerset The Training Officer, British Hovercraft Corporation Ltd, East Cowes, Isle of Wight) *Note:* Apprenticeships in Westland Helicopters Ltd, Yeovil also cover Normalair-Garrett Ltd and Westland Engineers Ltd			Degree students may read any subject mentioned under 'Branches of engineering' or (if at traditional universities) Science, Engineering, Arts	
Wickman Machine Tool Manufacturing Co. Ltd, Banner Lane, Tile Hill, Coventry Wickman Wimet Ltd Wickman Machine Tool Sales Ltd, (Applications to: Training Officer)	Manufactured and factored machine tools and tungsten carbide products	Mechanical Production	*16–18 Technical Apprenticeship* Day release for O.N.C. and H.N.C. *18 'A' level Student Apprenticeship* Thin sandwich courses for H.N.D. or B.Sc. at Lanchester Polytechnic or the University of Aston, or 1:3:1 course at Birmingham University	G P Sch 4 p.a.
Wilkinson's Rubber Linatex Ltd, Camberley, Surrey, (Applications to: Works Manager)	Vibratory screens, pumps, pipes, chemical engineering machinery	Mechanical Production	*17–18½ 'A' level* Thin or 1:3:1 sandwich course for degree and qualifications of Inst.Mech.E. A member of the Engineering Industries Group Apprenticeship scheme. Own choice of college or university with slight preference for Portsmouth Polytechnic	Occasional Vacancies P Sch G
Willcox, Raikes & Marshall, Stock Exchange Buildings, 33 Great Charles Street, Birmingham B3 3JR (Applications to the Firm)	Civil Engineering consultant work specialising in Public Health Engineering – separation processes applied hydraulics, soil mechanics, design of water retaining structures etc. Work mainly undertaken for Local Authorities in England and Wales	Civil Engineering	*School-leavers, minimum 17 'O' level, Technician grade* Day release for O.N.C. in Engineering followed by transfer to sandwich course for degree or H.N.D. *'A' level, Professional grade* Sandwich course for honours degree at technological university or polytechnic of student's choice. Courses available at University of Aston in Birmingham, Portsmouth Polytechnic, and elsewhere	No closing date but applications preferred before end of April Applicants should preferably reside in Birmingham area No financial sponsorship while at college
George Wimpey & Co. Ltd, Hammersmith Grove, London W6 (Applications to: Chief Training Officer)	Building, civil, mechanical and electrical engineering construction	Architecture Building Civil Eng. Mechanical Eng. Electrical Eng. Quantity Surveying	*Age 17–19 for all branches* *Architecture – two 'A' levels, academic subjects* Sandwich course for R.I.B.A. qualifications	

Name and address of firm and any other locations where training may take place	Products	Branches of engineering or science	Age at entry and details of course	Notes (see p. 54) and approx. no. of vacancies p.a.
George Wimpey & Co. Ltd – *continued* Comprehensive practical training in Head Office, construction sites and regional establishments throughout UK			*Building – 'A' Maths. and Physics or Chemistry* Sandwich course for B.Sc. (Building) or H.N.D. (Building) and practical training for membership Inst. of Building *Civil Engineering – 'A' Maths. and Physics* Sandwich course for B.Sc. and practical training for M.I.C.E. *Mechanical Engineeering – 'A' level Maths. and Physics* Sandwich course for B.Sc. and practical training for M.I.Mech.E. *Electrical Engineering – 'A' level Maths. and Physics* Sandwich course for B.Sc. and practical training for M.I.E.E. *Quantity Surveying – two 'A' levels, academic subjects* Sandwich course for examinations of the Institute of Quantity Surveyors The above are thin sandwich courses: 1:3:1 students are seldom accepted. Applicants have free choice of college except where indicated	City University for U.C.C.A. applications
Yarsley Research Laboratory Ltd, Clayton Road, Chessington, Surrey (Applications to: Personnel Officer)	Carries out work in organic chemistry, the moulding and fabrication of plastics, mould design and construction, and investigations into the applications of polymers to the problems of clients	Chemistry Plastics Technology	*16–20 minimum four 'O' levels* Day release for O.N.C. (Sciences), H.N.C. (Chemistry), 'A' levels, Grad.R.I.C., Diploma of the Plastics Institute, or B.Sc.	4 p.a. G P – not part of sandwich course – general laboratory work for a year before university
Yarsley Testing Laboratories Ltd, The Street, Ashtead, Surrey (Applications to: Personnel Officer at Chessington – see above)	Testing and analysis of a wide variety of metallic and non-metallic materials including plastics, rubbers, adhesives, organic chemicals	Chemistry Physics Plastics Technology	*16–20 minimum four 'O' levels* Day release for O.N.C. (Sciences), H.N.C. (Physics or Chemistry), 'A' levels, Grad.R.I.C., Diploma of the Plastics Institute, or B.Sc.	4 p.a. G P – as for Chessington see above

Key to Notes column in Section 1

G =The company also employs graduates direct from university.

P =The company is willing to take students for practical training before they go to university. This is almost always part of a thick sandwich or 1:3:1 course (see Introduction). In a few cases, mainly applying to science students, firms will provide a year's pre-university training (or nine months in the case of Oxbridge entrants) without stipulating that the student returns for vacation or postgraduate training. Opportunities for 'gap-filling' employment of this kind are indicated by an explanatory note after the letter P in the final column.

Sch =The company provides financial assistance towards degree courses, whether they are full-time at universities, or thin sandwich at technological universities, polytechnics or colleges of technology. Such financial help is usually limited to a grant of £100 p.a. for a 1:3:1 course or £66 p.a. for a thin sandwich course. This is the maximum that an employer is allowed to contribute without prejudice to the student's L.E.A. grant.

Some organisations, however, make scholarship awards to cover the whole course including fees and maintenance, or continue to pay full salary (plus fees) to their students while they are at college, in which case the student does not apply for a grant from the Local Education Authority. Details of these schemes are given in Section 3 INDUSTRIAL AWARDS FOR DEGREE COURSES.

H =Hostel accommodation is available for students.

2 Group Apprenticeship Schemes

(a) The Engineering Industries Group Apprenticeship

Increasing efforts are being made by the smaller and more specialised engineering firms to provide first-class training for all grades of apprenticeship.

Ninety-five per cent of the firms in the engineering industry employ less than 500 people, 73 per cent employ less than 100. This means that more than half the people in engineering work for the small and medium firms.

Until recently, however, few such firms have been able to offer comprehensive and balanced training and in consequence have not attracted the type of young man they need particularly in the technical and technological fields.

During the last fifteen years a new form of training has been developed known as EIGA – the Engineering Industries Group Apprenticeship – which has enabled the smaller firm to offer worth-while and recognised training to boys who will one day become the technicians and managers of industry.

EIGA apprentice training is essentially 'on the job', although in many cases special arrangements are made for periods of experience in training schools. For example, under new arrangements made by the Engineering Industry Training Board, first year 'off-the-job' training at special Training Centres is offered to apprentices as paid employees of their sponsor firms. An important advantage of training in a smaller firm is a more personal contact with management and often the opportunity of training near home.

EIGA, which operates in many parts of the country, consists of groups of firms who have agreed to combine their training resources. Each group of some 20 firms has an independent Training Officer who is a qualified engineer, a member of one of the professional institutions, who interviews and selects boys, plans their training according to agreed syllabuses, supervises their practical work, arranges their theoretical studies at the local technical college, and generally helps the firms to give and their boys to receive the best possible training.

Before a boy is enrolled in EIGA he is interviewed by the Training Officer, who will also wish to see his parents to explain the training to them; if approved the boy will then be sent to a member firm as a candidate for apprenticeship. This firm may then accept and engage the boy as a probationer. Probation usually covers a period of three to four months, after which the apprentice is indentured for four or five years according to the type of training he is to receive.

Initial training is given in the works of the parent firm but later on boys are transferred for varying periods to other firms in the group to gain experience not only of machines, processes and functions not covered by the parent firm but also to gain experience of working under different conditions and different managements.

During the training the apprentice is required to attend technical college to acquire the necessary theoretical knowledge, either for one day each week or for specified 'block' or 'sandwich' periods in each academic year. Students reaching a high standard in their Ordinary National Diploma examination, or having G.C.E. at 'A' level, may be eligible for consideration for Higher National Diploma or degree sandwich courses.

There is no fixed age of entry for EIGA apprenticeship, but application should be made before May for entry in September.

Technician Apprentices

Candidates should preferably have reached G.C.E. in Mathematics, Science and English and be capable of direct entry into the second year of the General Engineering course at a technical college and will then follow day or block release courses for Ordinary National and Higher National Diplomas.

Student Engineer Apprentices

A G.C.E. in four subjects at 'O' level, including Mathematics, English and a Science subject is the minimum qualification for a student apprenticeship following a day release course at technical college. Those with 'A' level G.C.E. in Mathematics and a Science subject may be considered for sandwich courses for the Higher National Diploma or a degree. Student Engineer courses are planned

to give the apprentice the necessary qualifications for membership of one of the Professional Institutions.

EIGA is at present operating in the Home Counties, the Midlands, Yorkshire, the North West and the South West and is being extended to cover he remaining industrial areas. The finances of the scheme are now under the Industrial Training Foundation, a charitable trust, for whom EIGA undertake all operational responsibilities.

Full details may be obtained from:
EIGA Partnership,
18 Thurloe Place, London SW7.

(b) The Scottish Electrical Training Scheme. For Graduates and Undergraduates

Background

In Scotland the electrical engineering industry is important and expanding; it is composed of medium and small sized firms. Many of them have had their own student and graduate apprentice training schemes, but they have been unable to give their students as comprehensive a training as they would have wished to provide.

Policy

SETS was established in 1957 to enable Scotsmen, and others who wish to make their careers with the Scottish electrical industry, to receive in Scotland the full training which should be the aim of all those entering the electrical engineering profession. By giving men who join it experience of many sides of the industry, SETS enables them to form their own judgement, after experience, on the types of career to adopt.

The members of SETS Ltd are the two Electricity Supply Boards in Scotland (North of Scotland Hydro-Electric and South of Scotland Electricity), four manufacturing firms (Reyrolle Peebles Ltd, Parsons Peebles Ltd, Ferranti Ltd and Scottish Cables Ltd), and one electrical engineering contractor (James Kilpatrick & Son Ltd). The Boards produce and supply all Scotland with electricity, operating generating stations (steam, diesel, hydro-electric and atomic) and the necessary transmission, distribution and protection systems for nearly two million consumers. The four firms manufacture medium and large AC and DC motors and generators, hydro-electric turbines, pumps and valves, transformers and rectifiers; medium and high voltage switchgear; radar systems, electronic data processing systems, inertial navigation systems, temperature control systems, industrial servo control systems, numerical control of machine tools, aero and missile systems, microwave devices, medical, industrial and scientific instrumentation, electronic components; oil-filled and paper and plastic insulated electric cables. The electrical contractors supply and maintain (and often also design) installations of all kinds at home and overseas. The Members' requirements are as much for light current and electronic specialists as for power electrical engineers.

Training

(i) Those who join SETS are trained by the Members, all of whom provide it with vacancies in their training organisations.

(ii) SETS accepts for training only sufficient men to fill the Members' vacancies, thus ensuring a future career. The advantage to the trainees is that they are sure of a wide, planned training which is framed to meet the target of the young engineer, attainment of the status of Chartered Engineer.

(iii) Pre-college and vacational training periods are used to cover the ground-work of the training, viz., knowledge of the basic tools and materials used in the industry and of the principles and practices of adopting them in supply, manufacture and electrical contracting, and of the people who work in the industry. This training is offered to those taking engineering degree courses at 'traditional' universities, during the long vacations, or at technological universities or colleges providing 'thin' sandwich courses leading to degrees. For the latter the period of SETS graduate training is reduced to six months. Some bursaries are offered to those on thin sandwich courses. SETS is prepared to consider applications from those on degree courses other than engineering if it is their intention to become professional engineers.

(iv) Although SETS' primary objective is to produce trained Electrical Engineers for its Members, some of them, the manufacturing Members, also give to SETS the task of training Mechanical Engineers and Production Engineers for them. The pattern of training for them is the same as for Electrical Engineers.

(v) Graduate training. The period in SETS is for one year; then the graduate engineer joins the service of one of the Members, either straight into a junior engineering appointment or for further training for up to one year.

(a) The year in SETS will be spent in completing the knowledge acquired before graduation as to materials, tools and processes, in widening experience and in giving the trainee a complete picture of the industry, while working in engineering offices etc with professional engineers. The training covers all aspects of their work, including development, design, manufacture, test, installation and maintenance.

(b) At the end of the SETS year the graduate engineer enters the service of the Member of SETS of his choice, provided that the Member has an appointment for him. At that time a decision is made as to whether there will be any further training, to give the necessary experience needed before filling a specific appointment. In some cases none is required; in others, depending on the individual, his past experience and the post to be filled, it may be for between 6 and 12 months.

(c) SETS provides, for most graduates, an intensive twelve-week 'Bosworth' type Manufacturing Technology course.

Administration

Those who train with SETS Ltd are employed and paid by it and administered by the Chief Executive; while with each Member the details of training etc are arranged by that Member. The Company's office is at *127 Saint Vincent Street, Glasgow C2.*

Note. The Group Apprenticeship Scheme run by the North-East Training Council, which appeared in the last edition, has been discontinued.

3 Industrial Awards for Degree Courses

With one or two exceptions, this Section includes only organisations offering full support while the student is at university or college. Many employers offer limited support, usually £100 p.a. for full-time students and £66 p.a. for those on thin (6 months: 6 months) sandwich courses. This is the maximum they are allowed to contribute if the student is not to have his L.E.A. grant reduced. Organisations offering this supplementary support are indicated by the letters 'Sch' in the NOTES column of Section 1 (pp. 1-53).

Anglo American Corporation of South Africa

The associated companies of the Anglo American Corporation, De Beers and Charter Consolidated, together comprise one of the largest mining groups in the world. It prospects for, and produces, gold, diamonds, uranium, copper, lead, tin, zinc, cobalt, coal, nickel, iron ore, wolfram, vanadium and potash. The group is operating and/or prospecting in the UK, Portugal, North, East and West Africa, South Africa, Zambia, Canada, Malaya, Australia, Mexico, Peru, Turkey and Iran.

Scholarships are available for university courses in Mining Engineering, for school-leavers who obtain a place in the mining department of a British university or at the Camborne school of Metalliferous Mining. The value of the award is £550 per annum, plus fees, and there is no means test.

The selected candidates are flown to South Africa during the Easter holidays to that they may satisfy themselves about their choice of career. On graduation scholars start their career in South Africa but they could at some later stage find themselves moved to any part of the world.

Entries for scholarship close on the 1st January each year.

Applications to:

Anglo Charter International Services Ltd, 7 Rolls Buildings, London EC4A 1HX.

The Automotive Products Group (Lockheed Hydraulic Brake Co. Ltd, and Associated Companies)

University Scholarship Scheme

A number of awards are available each year to boys direct from school or in the service of the Companies. They cover a five-year period comprising one year's pre-university practical training, three years at a British university studying for an honours degree in Physics, Mathematics, Engineering, Metallurgy, Economics or allied subjects, and one year's postgraduate training under the Graduate Training Scheme. The onus of obtaining entrance to university is on the applicant. During pre-university training scholars are paid the appropriate apprentice rate for age, and during their university course are paid a grant, currently varying between £575 and £870 per annum. On rejoining the Companies for graduate training they are paid the appropriate second year rate on the Graduate Training scale. At present this is £1,417 per annum. Application must be made to the Group Education Officer by 15th February in the year preceding date of entry to university (i.e. in 1972 for university entrance in 1973).

Scholarship at St Catherine's College, Oxford

One scholarship is available annually to school leavers to study Physics, Engineering Science, Engineering with Economics, or Metallurgy at St Catherine's College, Oxford. The terms of the award include one year's pre-university practical training during which the scholar receives the appropriate apprentice rate for age. During his university course he receives a grant (currently of the value of £960 per annum) which is made irrespective of means or of any other award from College or public funds.

The award of this scholarship does not involve any obligation on the scholar to seek subsequent employment with the Automotive Products Group. Should he wish, however, to apply for admission to the Graduate Training Scheme, he will receive favourable consideration.

Candidates for the award must have satisfied the matriculation requirements of the University of Oxford at the time of

application, or be preparing to complete these requirements by June of the year in which they apply. The selected scholar is expected to have passed the Preliminary Examination in Natural Science before taking up residence at the College.

Applications must reach the Group Education Officer by 31st October two years prior to the date of entry to university (i.e. in 1972 for university entrance in 1974).

Scholarship at the University of Warwick

One scholarship is awarded annually to school leavers to study Engineering Science at the University of Warwick. The terms of the award include one year's pre-university practical training, three years' study at university, and one year's postgraduate training under the Companies' Graduate Training Scheme. During pre-university training the scholar is paid the appropriate apprentice rate for age, and during the university course a grant, currently of the value of £625 per annum, which is made irrespective of means or of any other award. On rejoining the Companies for graduate training the scholar is paid the appropriate second year rate on the Graduate Training scale which is currently £1,417 per annum.

Candidates for the award must have satisfied the entrance requirements for the University of Warwick at the time of application, or be preparing to complete these requirements by July of the year in which they apply.

Particular attention is drawn to the University's special provisions enabling applicants with 'A' levels drawn from the Social Sciences, Arts and Sciences, to enter the School of Engineering Science.

Applications must reach the Group Education Officer by 15th January in the year before the date of entry to university (i.e. in 1972 for university entrance in 1973).

Sandwich Scholarships for Degrees in Technology

School leavers and employees not over the age of twenty with the necessary entry qualifications are eligible to apply for Sandwich Scholarships leading to degrees in Automotive, Mechanical or Production Engineering.

Application forms and further information may be obtained from the Group Education Officer, Automotive Products Company Ltd and Associated Companies, Tachbrook Road, Leamington Spa, Warwicks.

Birmingham University: The Brockhouse Scholarship

J. Brockhouse & Co. Ltd of West Bromwich, general engineers and manufacturers of steel products, have established a scholarship at Birmingham University which is tenable in any Faculty of the University for the normal period prescribed for the Bachelor's degree. Its value is the composite annual fee together with a maintenance allowance (£305 per annum for a student living at home; £380 per annum for a student living in lodgings or a Hall of Residence).

No special examination is held; results obtained at 'A' level in the G.C.E. will be considered and candidates may be required to attend for interview.

Preference will be given to those candidates whose parental income is such as to prevent them from obtaining the full benefit of a Local Education Authority award. If a suitable candidate in this category cannot be found, three or more scholarships of £100 per annum may be awarded by the Selection Committee.

Applications should be sent to the Registrar, The University of Birmingham, P.O. Box 363, Birmingham B15 2TT.

BP Chemicals International Ltd

A large group manufacturing chemicals and plastics.

Some 15 Studentships are offered annually to those intending to read Engineering at university or polytechnic. Both 1:3:1 and thin sandwich courses are supported. Most vacancies are in Mechanical, Electrical or Control Engineering, but some Chemical Engineering students may be considered.

Integrated sandwich course students are paid a full salary of £800 – £1,000 per annum throughout the course including college periods and a full grant is paid to 1:3:1 students. In neither case, therefore, does the student have to apply for an L.E.A. grant.

Students have a free choice of university or college.

Enquiries to Staff Manager, BP Chemicals International Ltd, Stratton House, Stratton Street, London W1X 6LS.

British Leyland Motor Corporation

Most British Leyland Divisions provide limited support for student apprentices and trainees who have got L.E.A. grants. The amounts vary with the choice of university, college or the type of course, but do not exceed £100 a year.

Some Divisions send students to university and polytechnic courses after one year with the firm, awarding scholarships which cover fees and subsistence, and Jaguar send selected students on full salary.

Specific Scholarships are awarded to exceptional students and vary in amounts, up to £550 a year, in some cases. Details may be obtained from the training manager of:

- Bus and Truck Division, Leyland, Lancashire
- Austin-Morris and Manufacturing Group, Longbridge, Birmingham 31

– Austin-Morris and Manufacturing Group, Cowley, Oxford

Applications should be received by February for the following September. It is hoped that scholarship winners will remain as Corporation employees, but there is no binding agreement either way.

The British Paper and Board Makers' Association (Incorporated)

In order to stimulate interest in the degree courses in paper science at the University of Manchester Institute of Science and Technology, and to ensure a steady and adequate supply of scientifically trained men to the paper trade, the Association provides a series of scholarships each year, known as the George Rackley Scholarships. The value of these scholarships is £100 a year up to a limit laid down by Trustees.

The scholarships are normally granted for a period of three years, starting from the beginning of the University year in early October, but consideration is also given to graduates who want to proceed to the higher degree courses when the rating will depend on the circumstances and qualifications of the candidates concerned within the limit.

Applications for scholarships should be made on a prescribed form obtainable from the Secretary, The British Paper and Board Makers' Association (Inc.), Plough Place, Fetter Lane, London EC4, by 1st May each year.

The British Petroleum Co. Ltd

The British Petroleum Company Ltd, through full time and sandwich course Apprenticeships, offers students the choice of two alternative training courses whereby they can achieve full professional qualifications and the opportunity of working in the Company as graduate staff.

Competent, qualified and ambitious young men are required in the London Office, the Research Centre, and in the Company's refineries and oilfields, and marketing Companies at home and overseas.

FULL TIME APPRENTICESHIPS

Each year candidates are selected on the basis of ability shown in their school work later confirmed by 'A' level results, and an assessment of suitability at an interview.

Those selected follow a full time honours degree course in science or technology at a British university.

Throughout the course students remain employees of the Company and receive a salary, but, when at university, are regarded in every way as normal undergraduates.

Most of the Company's full time education Apprentices are studying at the following universities, and the Company will be particularly interested to receive applications from students intending to enter one of them.

Belfast, Birmingham, Cambridge (Mechanical Engineering). Edinburgh, Kent, London, Manchester, Oxford, Swansea, Warwick.

The university to which a candidate would go depends on the course of study, but the Company would take into account personal preference.

Application to the Company should, therefore, be made before approaching the U.C.C.A. and preferably at least one year before sitting 'A' level examinations.

Subjects in which these Apprenticeships are available

Chemical Engineering, Mechanical Engineering, Chemistry, Physics, Mathematics.

Entry Qualifications

Candidates should be not more than nineteen years of age and must either already possess university entrance qualifications or be working to obtain them. For the science student in England and Wales this would normally mean G.C.E., which includes English Language and a foreign language at 'O' level and good 'A' level passes in Mathematics, Physics and Chemistry or, in some cases, in Pure Mathematics, Applied Mathematics and Physics.

A Scottish candidate should possess good passes in appropriate subjects at the Higher certificate level and be undertaking a normal 6th year course of study preparatory to university entrance.

Salary and Fees

The Apprentice is paid a salary of £510 per annum, paid monthly, less statutory deductions, which is free of tax and does not affect parental tax allowances. The Company pays university approved fees, a book allowance and certain travel and other expenses, but the Apprentice is responsible for boarding and other living costs.

Vacation Training

During long vacations, normally in the months of July and August, arrangements are made for Apprentices to gain practical training in a refinery, the Research Centre or other Company establishments.

SANDWICH COURSE APPRENTICESHIPS

Apprenticeships are available to those who would prefer to combine a higher education with practical experience in industry by means of a sandwich course.

3 Industrial Awards for Degree Courses

Apprentices attend the following universities/colleges:
Glamorgan Polytechnic – Chemical Engineering
City University, London – Mathematics and Related Subjects
Kingston Polytechnic – Applied Chemistry
Northern Polytechnic, London – Chemistry
Portsmouth Polytechnic – Business Studies
Thames Polytechnic – Mechanical Engineering
University of Stirling – Business Studies
Ealing Technical College – Business Studies

Subjects in which Sandwich Courses are available:
Industrial:
Chemical Engineering, Mechanical Engineering, Chemistry, Applied Chemistry.

Commercial:
Business Studies, Technological Economics, Mathematics and Related Subjects.

Entry Qualifications
Candidates must satisfy the entrance requirements of both the college, or university which they will attend, and of the Company.

For an Industrial Apprenticeship a G.C.E. is required which includes English Language at 'O' level, and good passes in appropriate science subjects at 'A' level. These subjects would normally be Mathematics, Physics and Chemistry, or Pure Mathematics, Applied Mathematics and Physics.

For Commercial Apprenticeship candidates must possess a G.C.E. which includes English Language and Mathematics at 'O' level and at least two good 'A' level passes. For Economics courses Mathematics beyond 'O' level is an advantage.

Salary and Allowances
Apprentices are paid a salary which increases yearly subject to satisfactory performance. The scale is as follows:

1st year	£828 per annum
2nd year	£882 per annum
3rd year	£936 per annum
4th year	£990 per annum

All approved college and examination fees are paid by the Company and the cost of essential books, certain travel expenses, etc., are also met by the Company.

Application for the Industrial Apprenticeships should be made by December of the year prior to that in which candidates are due to sit 'A' level examinations.

There are two intakes each year for Commercial Apprentices; these are in February and September, for which application should be made as follows:

February Intake
Application not later than during the preceding June/July.

September Intake
Application not later than during the preceding January/February.

Training
The pattern of training may vary from subject to subject. In most cases Student Apprentices spend six months of each year in full time study at a technological university, or polytechnic, whilst the remaining six months are spent gaining practical experience in Head Office departments, refineries in England, Scotland, Wales and Northern Ireland, or other Company centres.

The Employment of Graduates
On graduation and the completion of Apprenticeship the successful Apprentice will be considered for employment as a Probationer (Industrial or Commercial) within the BP Group at home or overseas.

General
Applications or further enquiries should be addressed to the Manager, External Recruitment, The British Petroleum Company Limited, Britannic House, Moor Lane, London EC2Y 9BU.

British Railways Engineering Scholarships
(*a*) *Full-time courses*
The British Railways Board offer annually a small number of university scholarships to enable boys who show promise in engineering studies, and real interest in railways as a career, to study for honours degrees in engineering. Applicants should sincerely intend to make their career with British Rail, although they are not required to sign a legal agreement to do so.

Each scholarship is worth £650 a year. In addition, British Rail pay the student's tuition fees, and the cost of textbooks up to a maximum of £25 a year.

Scholarships are normally tenable for five years. The first year is spent on practical engineering training with the railways; the next three, or four if the course so requires, in reading for an honours degree at a university. On receiving his degree, the scholar is appointed to the British Rail staff as an engineering graduate, and spends a further year on practical training before being appointed to a responsible post in the engineering department.

Each applicant must secure his own place at a university. British Rail will help intending applicants with advice if necessary. Candidates must pass a medical examination.

Scholars are expected to take a full part in university life and to secure a good honours degree. During vacations, they are expected to undertake work suitable to the development of their course. Such work may be either practical or academic. While engaged on it, the scholar receives the normal allowance made to university students working with British Rail.

Applications should be made to the Principal Management Recruitment Officer, Royal London House, 22/25 Finsbury Square, London EC2P 2BQ.

(*b*) *Sponsored Sandwich Courses*
British Rail is prepared to sponsor the engineering education of a number of boys who wish to take an engineering degree at one of the new technological universities, polytechnics or approved regional colleges using the thin sandwich method of training. These courses of training normally last four to five years and consist of alternate periods (usually of six months) of academic work at college and practical work with British Rail.

These courses cover Civil, Mechanical and Electrical (heavy and light current) engineering and are open to boys who are about to leave school and are studying to a level qualifying for university entrance. Candidates should, of course, intend to make their careers with British Rail.

During the whole period of training, the student is a member of the railway salaried staff, and on satisfactory completion of training and the award of his degree will be appointed to a suitable post in British Rail.

Application should be made to the addresses given on page 10.

Burmah Oil Trading Ltd
Burmah Oil is a British company which began in Glasgow in 1886 and sank its first oil well in Burma. Today the Group operates in Britain, the Republic of Ireland, Europe, India, Pakistan, Australia, Canada, the USA, Peru and Ecuador, and owns or has interests in seven oil refineries. It has grown by setting up new projects like the multi-million pound expansion programme at its Ellesmere Port refinery, and by acquiring already prosperous businesses, including Castrol and Rawlplug.

Burmah Group companies are active in all the operations of the oil industry: exploring for new sources, producing, refining, processing and selling oil and gas. There is also a strong and growing 'non-oil' side. The companies which make up The Burmah Engineering Company and Burmah Industrial Products Ltd design and build oil and chemical plant, and make and sell lapping machines, mechanical seals, sealing compounds, fixing devices, tools, technical waxes, etc.

University Apprenticeships
As it continues to expand and diversify the Group will need more and more competent staff for its oil fields, refineries, factories and marketing companies. To fill some of these exacting posts in years to come, it offers University Apprenticeships to a number of students annually.

Courses available:
Industrial Chemistry and Chemical Engineering – Loughborough University of Technology
Mechanical Engineering – Salford University
Economics and Administration – Bath University of Technology

These courses are organised on a sandwich basis. Practical work is arranged at one of the Group refineries, laboratories or offices in the UK, and is planned for each student in consultation with his tutor at his university, so that it will supplement his studies.

A condition of the apprenticeship in Economics and Administration is that the student should intend to become a qualified accountant after completing the course.

Entry Qualifications
Candidates must either possess, or be working to obtain, the necessary qualifications for the particular course. The candidate should normally specify on his U.C.C.A. form the university at which the Burmah apprenticeship is offered; but students who have already applied to U.C.C.A. without mentioning the university at which the apprenticeship is offered, can still be considered.

Salary and fees
Students joining as University Apprentices are on the staff of the Group and salaries are paid on the following basis:

1st year	£726 per annum
2nd year	£780 per annum
3rd year	£867 per annum
4th year	£960 per annum

Salaries are paid throughout the course. The company also pays university fees, a book allowance, and certain travel and other expenses. The apprentice is responsible for his own board, lodging and other living costs.

On successfully completing his final examination, it is intended that the apprentice will be assigned to full time employment in the Group on terms and conditions of service applicable to graduate staff.

Applications
Applications should normally be made by December of the year prior to that in which the candidates take their 'A'

levels, and should be addressed to the Group Training Manager, Burmah Oil Trading Ltd, Burmah House, 57 Chiswell Street, London EC1.

Cadbury Schweppes Ltd, Bournville
The Company has operated a Scholarship Scheme for many years, and the normal procedure is to invite applications from any young men or women in the organisation who have the qualifications to take a course in either technical or non-technical subjects. It then selects two or three a year, one or two of whom will be from the technical or scientific sides of the business. Since the war the Company has sent men to Oxford, the London School of Economics, Hull, Southampton, Birmingham, Nottingham, Loughborough, Manchester and Cardiff, as well as to the Birmingham College of Technology and the Polytechnic of Central London. In addition, the company offers graduates qualifying experience for membership of the Institution of Mechanical Engineers.

Chamber of Mines of South Africa
Mining Engineering Scholarships
The Gold Producers' Committee of the Chamber of Mines of South Africa, Johannesburg, Republic of South Africa, has established a scholarship scheme to enable selected candidates residing in overseas countries, who have recently reached university entrance standard, to take a course of study leading to the degree of B.Sc. (Eng.) Mining at The University of the Witwatersrand, Johannesburg (English Medium), or The University of Pretoria, Pretoria (Afrikaans Medium).

Three scholarships valued at R2,000 (£1,160) per annum each are made available annually, and are renewed for the full three-year period of the course, subject to satisfactory reports of the scholar's progress.

The academic standard which will be required includes passes in the G.C.E. at 'A' level (Grade A) in:

Pure Mathematics or Applied Mathematics or
Mathematics Pure and Applied;
and Physics or Chemistry.

Applicants must be under the age of 25 years on 1st January of the year in which the scholarship is to be awarded, and successful candidates will be required to pass a medical examination prescribed by the Miners' Medical Bureau, Johannesburg. They will be required to give a written undertaking that on graduating as a mining engineer they will work for a mining company, member of the Chamber of Mines, or for an organisation approved by the Chamber, for a period of not less than four years. During this period, scholarship holders will be paid at the rate for a graduate in the occupation.

Further information and application forms are available from the London Representative, Chamber of Mines of South Africa, 7 Rolls Buildings, Fetter Lane, London EC4A 1HX. Applications must be lodged by 30th April for consideration by a Selection Committee in London. Awards either definite or provisional will be made by June.

The South African university year begins in mid-February.

Civil Engineering Scholarships
The Civil Engineering Scholarship Trust was founded in 1958. Its sponsoring bodies are the Institution of Civil Engineers, the Association of Consulting Engineers and the Federation of Civil Engineering Contractors, and its aim is to promote education in Civil Engineering by providing Scholarships for boys and girls of adequate academic ability and the qualities of character, leadership and determination likely to lead to success in the profession of Civil Engineering. The present practice of the Trust is to confine its awards to £100 per annum, since to give more would, in most cases, merely mean a corresponding reduction in the amount of the State or Local Authority Grant. In the very rare cases where students are not eligible for such grants a Trust Scholarship of over £100 may be awarded. The Trust currently aims to award about 50 scholarships each year.

Applicants must be of British parentage and normally resident in the United Kingdom. They must produce evidence that they have the academic qualifications necessary for entry upon the approved course of study which must lead to a qualification recognised by the Institution of Civil Engineers as exempting from their educational requirements for admission to Corporate Membership.

Applicants must make their own arrangements for admission to courses.

Further details and application forms may be obtained from the Hon. Secretary, The Civil Engineering Scholarship Trust Ltd, Romney House, Tufton Street, Westminster, SW1.

The Delta Group
The history of the Delta Group extends back to the late 19th century. From being primarily concerned with extrusion of copper-based alloys, the original company has expanded and become the Delta Group of Companies, employing nearly 25,000 people in more than 100 subsidiary and associate companies, both in this country and

overseas. The processes embrace a variety of manufacturing techniques in a wide range of non-ferrous metals.

A number of scholarships are offered each year to school leavers intending to go to a British university to read for an honours degree, or other suitable course approved by the company. The award will be conditional upon acceptance by a university, and the responsibility for obtaining a place rests with each individual applicant.

The company's concern in the production of non-ferrous metals and their engineering applications does not preclude awards to those planning to read subjects other than mechanical sciences, natural sciences, or metallurgy, and arts students are eligible.

Value of Awards

A maintenance allowance of up to £500 per annum (payable in advance at the beginning of each term) for full-time students. For students following sandwich courses, equivalent payments (payable in advance in two equal instalments) will be made in respect of each six-monthly college session.

Delta will pay university fees, examination fees and other essential dues and make a grant towards textbooks.

The scholarship will last for the normal duration of the course.

Company training may be on a 1:3:1 basis (thick sandwich); as a two-year Graduate Apprenticeship on completion of the course: or alternate periods of academic and industrial training for those on thin sandwich courses. In order to foster initiative and individuality the company may, on occasions, allow a student to arrange his own vacation programme.

Whether the student is on the technical or arts side, the industrial training is designed to cover both technical and commercial fields.

Applications should be submitted through the Headmaster on a form provided by the company, not later than 31st December. Application forms are obtainable from The Group Training Officer, The Delta Metal Co. Ltd, Delta Works, Dartmouth Street, Birmingham 7.

The Electricity Supply Industry

The Electricity Supply Industry offers university scholarships each year to school leavers who wish to read Electrical or Mechanical Engineering full time at university prior to making a career in the industry and who are considered likely to gain first or good second class honours degrees. Scholarships in Electrical and Mechanical Engineering are offered by the Central Electricity Generating Board and in Electrical Engineering only by the Area Electricity Boards.

To be eligible for consideration applicants must:

(a) Be not less than 16 or over 21 on 31st December in the year of application;
(b) Be normally domiciled in Great Britain;
(c) Have a broadly-based G.C.E. at 'O' level, including a pass in English, and at least three 'A' level passes in subjects which include Mathematics and Physics, or be taking these subjects at 'A' level in the following summer; or have taken sufficient subjects at the appropriate levels in the Scottish Certificate of Education to qualify for admission to a university in Great Britain.
(d) Have been offered or have applied for a place at a university in Great Britain at which they can read for a degree in the engineering subjects they wish to study.

The scholarships will provide for the payment of all approved fees in connection with the course and a maintenance grant at the rate of £500 per annum at Oxford and Cambridge, £490 per annum at London and £470 per annum at all other universities. All scholarship holders receive the full award irrespective of their own or their parents' income.

Scholarship holders will be required to spend a pre-university period of training in the industry, ranging from a few weeks to a year depending on the date of entry into the university. The confirmation of the award of the scholarship will depend upon the satisfactory completion of this period. Scholars may also be required to spend at least six weeks of one long vacation with the industry as paid trainees and a further six weeks of their other long vacation(s) gaining experience approved by their Board.

Those who obtain satisfactory degrees will be expected to undertake up to two years' postgraduate training in the industry. This will give them the opportunity to qualify for admission to one of the professional engineering institutions. On completion of their postgraduate training they will be offered an appointment on the engineering staff of their Board.

Applications for these scholarships should be made on the forms which have been supplied to the Headmasters and Headmistresses of all Public Schools. The closing date for the receipt of applications is 31st October.

Additional copies of the application forms and further information may be obtained from The Education and Training Officer, The Electricity Council, 30 Millbank, London SW1P 4RD.

3 Industrial Awards for Degree Courses

EMI Ltd
Under their 1:3:1 scheme for students of Electrical or Mechanical Engineering or Physics, EMI offer scholarships amounting to £550 per annum at Oxford or Cambridge, and £450 per annum for any other British University.

In addition, those on sandwich courses may be offered Bursaries of £100 per annum for academic periods to supplement the local authority grant.

Enquiries to the Training Manager, EMI Ltd, Hayes, Middlesex.

Ford Motor Co. Ltd
Studentships in Metallurgy or Materials Technology
Ford offers a four-year sandwich course leading to the B.Tech degree of Brunel University, which is situated in outer west London. Academic tuition and industrial training within the Company (or host firms offering special facilities) are interspersed in equal periods for the first three years. The whole of the fourth year is spent at university. An honours or ordinary degree may be taken.

Applicants should have at least five G.C.E. passes, including 'O' level English and 'A' level in two of the three subjects Mathematics, Physics, and Chemistry, with the third subject at 'O' level.

Full salary is paid throughout the course, together with all tuition and examination fees. Regular increments are given provided satisfactory progress is maintained.

Student Engineers
Similar arrangements exist for student engineers except that some are selected for full sponsorship and others receive the usual L.E.A. grant while at college plus a supplementary payment by the Company. Selection of those for full sponsorship is made both on merit and according to the branch of engineering in which they intend to qualify. There is a shortage in some branches, e.g. Production Engineering, but no scarcity of candidates for e.g. Mechanical Engineering, so that a candidate for the former would be more likely to qualify for full sponsorship.

Enquiries should be sent to the Apprentice Supervisor (34/138), Ford Motor Co. Ltd, Faringdon Avenue, Harold Hill, Romford, Essex RM3 8ST.

Greater London Council
Students released for B.Sc sandwich courses at the technological universities or colleges of technology receive full salary throughout the course, starting at approximately £901 at 18 (includes London Weighting) with annual increments. In addition the Council pays fees and gives assistance towards books and other expenses.

Enquiries should be sent to the Director of Establishments (PS) Greater London Council, London SE1 7PB.

Hayward Tyler & Co. Ltd
Manufacturers of various types of oil, water and chemical pumping equipment, turbines and electric motors, for conventional and atomic power generation, and for the chemical, shipping and other industries.

The Company trains its Student Engineers by means of thin sandwich courses in Mechanical Engineering at the technological universities and polytechnics. All successful applicants have full salary and college or university fees paid throughout the course, plus a book allowance.

Enquiries to the Training Manager, Hayward Tyler & Co. Ltd, P.O. Box 2, Luton, Beds.

H. J. Heinz Co. Ltd
An international organisation manufacturing in the USA, Canada, Australia, Venezuela, Mexico, Japan, Holland, Italy and Portugal, Heinz have been leaders in the food industry for nearly 100 years. The sales of the '57 Varieties' made in the UK since 1905, have more than doubled in ten years, and the Company now has three factories employing about 8,000 people.

New entrants selected for sandwich courses in Food Technology or Engineering normally spend one year in industrial training with the Company before proceeding to university. All trainees receive a full salary while sponsored on the course, both during industrial training and while at college. Current commencing salary at 18 is about £900 per annum, and annual increments are paid throughout the course. Students are not, therefore, required to apply for an L.E.A. grant.

Applications and enquiries to Personnel Officer, H. J. Heinz Co. Ltd, Hayes Park, Hayes, Middlesex.

The Institution of Electrical Engineers
The Council of the Institution administers a number of scholarships and other funds, from which it makes grants each year to students wishing to obtain professional qualifications in Electrical or Electronic Engineering. It is not the intention of the Council to supplement grants from L.E.A.s which are available to most students, but a grant may be made to a candidate who can show that, in his particular case, there is some special circumstance which causes hardship (e.g. special family responsibility). Grants may also be made to candidates who are not eligible for L.E.A. awards.

There are also scholarships, each of value £50, which are intended to reward students of Electrical or Electronic

Engineering who have done outstandingly well during their university courses. The Council places no restriction on the way the awards are used, but hopes they may help the recipients in such matters as overseas travel or purchase of books. In each year the Council decides how many such scholarships shall be awarded, and invites the appropriate authorities at universities to nominate candidates.

A booklet entitled 'Scholarship Regulations' is available from the Institution of Electrical Engineers, Savoy Place, London EC2R 0BL.

IBM United Kingdom Ltd, 389 Chiswick High Road, London W4

Scholarships

A number of scholarships of normal duration of three years may be awarded annually for full-time first degree honours courses in any subject, at any British university. Applications from boys and girls for awards effective from any 1st October, should be submitted through the Headmaster in time to reach the Manager, Education Relations Department, by 15th October, one year earlier. Importance is attached to character, ability to communicate and to capacity for leadership as well as to academic ability, which nevertheless would need to be of a standard indicated by 'A' grades in three or more subjects at 'A' level.

Studentships

Four-year thin sandwich courses leading to an honours degree in Electrical/Electronic Engineering or other Engineering subject. Salary starting at not less than £70 per month, during six-month periods of work with the company plus certain travel costs. Students are expected to maintain themselves during academic periods on County Awards. Maintenance grants may be augmented by an IBM grant, where a student has no other income, which would not reduce the value of the County Award. At Greenock and Havant preference is given to applicants from local educational institutions. Closing date 1st May.

Pre-University Employment

There is a handful of vacancies for school leavers who have six to nine months to spend before going to university. The work is mostly in computer programming and occasionally in Head Office staff functions, and is located in the London area and other large cities.

Applications should be submitted by 31st December to Education Relations Department.

Enquiries to: The Manager, Education Relations Department, IBM United Kingdom Ltd, 15 Lodge Road, London NW8.

London Transport

All sandwich students in Civil, Electrical or Mechanical Engineering are paid full salary by London Transport throughout their course including the periods when they are at college. Annual increments are given, and college and examination fees are paid. The London Transport Education Advisory Service is available to help students on any aspect of their studies.

Enquiries to Appointments and Welfare Officer, London Transport, 55 Broadway, Westminster, London SW1.

Medical Research Council

The Council are prepared to consider applications from members of their technical staff (see page 38) for the grant of bursaries to enable them to to take a university honours degree in science. To qualify for a bursary, the technician must have shown by his work that he has the power and ability to do independent research work of good quality and that these talents might be developed by full time study for a university honours degree in science, and that he is capable of taking, at least, a good second class honours degree.

A bursar continues to receive his normal salary and in addition all university fees are paid by the Council.

Enquiries to Medical Research Council, 20 Park Crescent, London W1N 4AL.

Michelin Tyre Co. Ltd

Michelin offers annually a number of University Apprenticeships to those who qualify for and wish to pursue an honours degree course in Mechanical or Electrical Engineering, Industrial Chemistry or Polymer Science at a United Kingdom university.

Engineering students should select their course from among those offered at the following universities:

Aston	Liverpool
Belfast	London (Imperial College)
Birmingham	Loughborough
Bradford	Manchester (U.M.I.S.T.)
Brunel	Salford
Cambridge	Sheffield
City	Strathclyde
Edinburgh	Wales (Swansea)
Leeds	

or the North Staffordshire Polytechnic.

Industrial Chemistry students take a course at Loughborough University, and Polymer Science students at the National College of Rubber Technology, which is part of the Northern Polytechnic in London.

3 Industrial Awards for Degree Courses

The programme involves a year's practical industrial and engineering training at the Company's Training Centre, followed by either three years at the university with specified vacation work each summer, and further training after graduation, or a four-year integrated course followed by an appropriate appointment in the Company.

Pay will be as follows, irrespective of parental income:

Age 17	£12·08 per week
18	£14·83 per week
19	£17·83 per week
20	£20·12 per week

In addition all academic fees will be paid, and lodging and travel allowances where appropriate.

Selection will be based on Headmasters' reports, an interview and group selection procedure.

Applications should be made by 15th December, but exceptionally may be considered up to late August. They should be marked 'P.S.A.B.', and addressed to the Recruitment Manager, Michelin Tyre Co. Ltd, Stoke-on-Trent, Staffs ST4 4EY.

Ministry of Defence – Royal Ordnance Factories Research and Development Establishments

Because of the wide range of their activities, the Royal Ordnance Factories and the Research and Development Establishments with which they are associated offer excellent facilities for training in Engineering. Opportunities exist to specialise in Aeronautical, Chemical, Civil, Electrical, Electronic, Mechanical and Production Engineering, or Metallurgy.

Industrial scholarships are granted to Student Engineers as part of their five year training to enable them to study for a degree in Engineering or Metallurgy at a university.

Some degree students do a year's practical training before, and a further year following the completion of their academic study. They also return for training during the long vacations. The course for the technological degree student is normally arranged on a thin sandwich basis, with periods of training in an establishment followed by periods of study at college throughout the apprenticeship.

Training is designed to meet the requirements of the appropriate professional institution.

University or college tuition fees are paid by the Ministry and students receive normal pay throughout the period of their college terms.

Applications and enquiries to the Industrial Training Officer (CM (IND) lc), Ministry of Defence, Room 302, Sentinel House, Southampton Row, London WC1B 4AX.

National Coal Board

The Board offer 60–70 university scholarships annually mainly in Mining Engineering but also offer Mechanical, Electrical and Chemical Engineering. The Mining Engineering scholarships are tenable at the universities of Strathclyde, Newcastle-upon-Tyne, Nottingham, Leeds, Wales (University College of South Wales and Monmouthshire) and London (Imperial College). The scholarships in Mechanical, Electrical and Chemical Engineering are tenable at any university in the United Kingdom offering a suitable honours degree course. It is the responsibility of the applicant to secure admission to a course.

The scholarships are not related to parents' incomes and may take the form of a full grant (a maintenance allowance of £315 to £450 per annum – dependent on university and lodgings – plus tuition, examination and other obligatory fees) or a £100 per annum supplement to a Local Education Authority grant. The supplementary award is the only form of scholarship offered in Chemical Engineering.

Practical work is provided during vacations. This is normally arranged by professors in consultation with local area headquarters.

Candidates should have taken or be preparing to take the G.C.E. or Scottish Certificate of Education, which

(a) if they are candidates for scholarships in Mining, Mechanical or Electrical Engineering, must include passes at 'A' level in Mathematics and Physics and preferably a pass at 'O' level in Chemistry, or in Scotland passes at the higher grade in Mathematics and Science (Physics and Chemistry); or

(b) if they are candidates for scholarships in Chemical Engineering must include passes at 'A' level in Chemistry, Physics and Mathematics (in certain cases an 'O' level pass in either Physics or Mathematics will be accepted), or in Scotland passes at the higher grade in Mathematics and Science (Physics and Chemistry).

An 'A' level pass in Physical Science will be accepted as the equivalent of a pass in Physics and Chemistry. An 'A' level pass in Engineering Science will be accepted as the equivalent of a pass in Physics, subject to university entrance to a three year honours degree course.

As an alternative to the scholarships scheme, school leavers may be recruited into the student apprenticeship scheme – these trainees have the opportunity of studying for C.N.A.A. sandwich degrees in Mining, Mechanical and Electrical Engineering combined with practical training in the industry. Salary is dependent on age, for example a student apprentice can expect to earn £15·35 per week at the age of 18 (1971 rates).

The academic standard reached must be sufficient to gain entry to the appropriate course.

Enquiries should be sent to the Head of Staff Training, National Coal Board, Hobart House, Grosvenor Place, London SW1, from whom pamphlets are available giving full details of the schemes.

Parsons Chain Co. Ltd

Parsons Chain Co. Ltd, with its associated company, British Wire Products Ltd, is part of the American Chain and Cable Company group. It is the largest chain making concern in Europe, and also manufactures conveyor assemblies and suspension gear for colliery shafts. British Wire Products Ltd make a variety of products based on wire rope, ranging from wire rope slings to control cables for the vehicle industry.

The Company is in a position to give a broad training, covering light and medium engineering, not limited to the chain making industry. On completion of his training the student is equipped with qualifications which will stand him in good stead in the field of engineering anywhere.

The Scholarship

The William T. Morris Foundation, Inc., was established by the late President of the American Chain and Cable Company Inc., for the purpose of supporting education. The Foundation has authorised Parsons Chain Company to establish a scholarship to be awarded to qualified applicants *resident in Worcestershire.*

One scholarship is available each year and is tenable at the University of Aston in Birmingham, where the holder will take a four year sandwich course under which he will spend alternating periods of six months at university and under training with the company. He will take the B.Sc. (Engineering) degree course, specialising finally in either Production or Mechanical Engineering, the choice being made at the end of the second year of the four year course.

Entry Qualifications

A candidate must have obtained passes at 'A' level with at least grade D in Physics and Mathematics and at 'O' level in English, Chemistry and one other subject. Selection is by competitive interview.

Remuneration

Pay will be related to the company's rates for technical apprentices and will be supplemented by allowances for books and for subsistence for the period spent at university.

Applications

Applications, on a form which will be provided by the company on request, should be completed and returned to the Personnel Manager, Parsons Chain Co. Ltd, Stourport on Severn, Worcs, before the end of February.

Platt International Ltd

A number of Scholarships/Apprenticeships are awarded each year to students who intend studying at a British university Mechanical Engineering, Production Engineering or Engineering Science. Awards are to the value of £550 per annum or £100 for supplementary awards. Postgraduate and research awards are also made.

Candidates must be qualified to enter a university or be expecting to qualify.

Successful applicants are able to spend a pre-university year under training within the company. Vacation training is also arranged and a further period of training may be done on completion of university study. One period of vacation training can be spent abroad.

Enquiries to Training Officer, Platt International Ltd, Holcombe Road, Helmshore, Rossendale BB4 4NG, Lancashire.

The Post Office

Studentship Scheme

The Post Office offers Studentships in Communications Engineering and Science to young men and women who are over 17 and under 20 years of age on 1st September of the year in which they apply and who possess university entrance qualifications or expect to obtain them during the year.

Education to honours degree standard is given in an appropriate branch of engineering or science, with industrial training for a year before entry to university and during long vacations, followed by a graduate-level appointment.

Salaries in the range £400 – £925 (depending on age and location) are paid during training and education. (These rates are under review.)

Selection is by interview, which is held, if possible, near to the applicant's school or home.

Applications should be sent, via the Headmaster or Headmistress, to reach the Post Office by 31st October of the year before commencement of Studentship.

Full details of the scheme and application forms have been sent to all public and grammar schools but information can be obtained from the Post Office Appointments Centre, Euston Tower, 286 Euston Road, London NW1 3DD.

Bursaries for Post Office Staff

A limited number of awards are made each year to members of Post Office staff with a minimum of two years' service, to

undertake, on full pay, approved first or second degree courses or certain examinations of professional engineering institutions.

The Post Office pays college fees and assists with some other expenses.

The industrial training part of the sandwich type of degree course consists of a period of practical training with the Post Office each year, so arranged as to form the most useful supplement to college studies. In other types of courses the student returns to duties with the Post Office for most of the long vacation.

Selection is by interview, at which the candidates' academic records and reports from controlling officers are taken into account.

Support is also given to selected members of the staff to undertake approved postgraduate courses.

Full details may be obtained from The Post Office, Telecommunications Personnel Department (TP3), Armour House, St Martin's-le-Grand, London EC1A 1AR.

A. Reyrolle & Co. Ltd

Under this scheme four suitable candidates will be selected each year for a thick sandwich course in Engineering. The training will take the form of one year's practical training in the Works followed by three years at a university of the student's choice. The student will then return as a post-graduate apprentice and complete his final year of training.

The qualifications required are two passes in the G.C.E. at 'A' level in Mathematics and Science (or Scottish equivalent) and a distinguished school record.

This scheme has the object of obtaining suitable recruits for training for managerial positions and also of helping those parents who could not otherwise afford to send their sons to university.

Remuneration is as follows:

Pre-graduate year	from £570 depending upon age.
1st university year	£350 for academic year
2nd university year	£350 for the academic year
3rd university year	£350 for the academic year
Postgraduate year	up to £1,550 depending upon qualification.

At the end of the course it is hoped that the engineer will remain with the Company for a minimum period of two years, but he will not be called upon to sign any agreement to this effect.

The first year will be a probationary year and the Company reserve the right to withdraw the scholarship should the behaviour of the student make this necessary.

It is the policy of the Company to allow apprentices and pre-graduates to attend one day per week at a technical college at its expense and with pay. The students in training under the scholarship scheme will be expected to attend selected courses in order to prepare themselves for the degree course and also maintain the sequence of learning.

Enquiries should be addressed to the Training Officer, A. Reyrolle & Co. Ltd, Hebburn, Co. Durham.

The Royal Institution of Naval Architects

Scholarships in Naval Architecture are available for courses at the University College, London, Glasgow University, University of Newcastle-upon-Tyne, University of Strathclyde, or an approved first degree course in Naval Architecture at any other university or college in the UK.

The R.I.N.A. scholarship is for three or four years according to the length of the course, and provides £400 per annum. Applicants must be under 23, having not yet entered a university course, or having been at university for not more than one year, after working in shipbuilding for at least two years.

Scholarships in Marine Engineering are available for courses at Glasgow University, University of Newcastle-upon-Tyne, University of Strathclyde, or at the University of Surrey. Similar conditions apply.

Enquiries to the Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1.

Sheffield University: Industrial Scholarships

EMGAS Scholarship

Through the East Midlands Gas Board a scholarship has been made available annually for award to a candidate wishing to read for a degree in Chemical Engineering and Fuel Technology (candidates wishing to read for a degree in other relevant subjects may be considered at the discretion of the Board). Preference will be given to candidates who express an intention of working for the East Midlands Gas Board after graduation.

The value of the scholarship is £360 per annum, plus tuition fees, residence allowance, and vacation work allowance. Further particulars may be obtained from the Education and Training Officer, East Midlands Gas Board, De Montfort Street, Leicester.

Ruston Hornsby Scholarship

This scholarship is open to male employees of Ruston & Hornsby Ltd, Lincoln, between the ages of 18 and 21, the scholar being nominated by the Company.

The tenure of the scholarship is for a period of three years, subject to the course of studies arranged and to the satisfactory attendance and conduct of the holder.

Further particulars may be obtained from the company.

Glass Sellers Company
The Worshipful Company of Glass Sellers of London offer scholarships in Glass Technology at the University of Sheffield. The value of a scholarship is £40 per annum and under the present regulations this may be retained by the scholar without the assessment of L.E.A. grant being affected.

The British glass industry, with its centres in London, the Midlands, Yorkshire, Tyneside, Lancashire and Scotland, offers well paid posts to qualified men, and the number of such posts is likely to increase for many years.

Enquiries and applications should be addressed to the Registrar, The University, Sheffield 10.

The Textile Institute
The Textile Institute administers two scholarship funds under the terms of which grants may be made to candidates who undertake to be employed in and for the benefit of the British Textile Industry.

The awards are to enable candidates to study full-time for degrees in textile subjects which grant exemption from Parts I and II of the Textile Institute's examinations, or for courses leading to Associateship of the Textile Institute.

The Eric Kann Scholarship provides a maximum of £750 per annum, and the Textile Institute's own Scholarship provides either a major award of £500 per annum maximum or a complementary award of £100 per annum maximum, the latter being intended to supplement L.E.A. maintenance grants.

Candidates must attend for interview in Manchester. They must be qualified for entry into their proposed course of study, or be able to indicate that they can satisfy the requirement within twelve months. Closing date is the end of July each year.

Prospective applicants should write to the General Secretary of the Textile Institute, 10 Blackfriars Street, Manchester M3 5DR, for an application form.

Thorn Electrical Industries Ltd
Thorn Lighting Ltd, one of the companies associated with the Thorn Group, offer scholarships to students who are interested in modern lighting in the fields of development, production and commercial application. The scholarships will normally be tenable for a period of four-and-a-half years, covering the whole period of a sandwich type honours degree course in Engineering.

The Polytechnic of the South Bank, London, offer such a course in electrical engineering, including the option of specialisation in lighting in the third and fourth years of the course.

Training will be offered at the Company's offices, works and laboratories and based at Enfield or Leicester.

Each scholarship has an annual value of not less than £900 in the first year, and its value increases in subsequent years. Payment will be partly by a lump sum to cover expenses whilst at college, and partly in the form of a weekly salary during the industrial training periods. The value of the award is not affected by any other award from college or public funds, nor by parents' income. In addition, all tuition and examination fees are paid by the Company.

Competition is open to British subjects, preferably resident in the United Kingdom, from any public, grammar or other secondary school or college of technology or further education.

Candidates should not normally be younger than 17 years nor older than 19 years at the time of application.

Candidates must satisfy the entry requirements for the selected degree course.

Applications may be submitted at any time by completing a form obtainable from the address below. Selection is normally undertaken from 1st January onwards for entry at the beginning of the next academic year in September or October.

There is no obligation on the part of a scholar to accept subsequent employment in Thorn Lighting.

For those unsuccessful in the scholarship competition there are opportunities for sponsored studentships either in Thorn Lighting or in other companies of the Thorn Group, namely British Radio Corporation Ltd, Thorn Domestic Appliances Ltd, Thorn Radio Valves and Tubes Ltd. Students are expected to apply for a local authority grant to cover college periods, which the company will augment to the extent permitted by the regulations.

Enquiries to Thorn Electrical Industries Ltd, Great Cambridge Road, Enfield, Middlesex.

Unit Construction Co. Ltd
The largest member of the Alfred Booth Group of Companies which operates nationally and internationally. Unit is based at Speke and is engaged in the construction of all kinds of dwellings including blocks of flats, as well as industrial and commercial premises, schools, and civil engineering works. The Company has long term plans for a considerable expansion programme, and is one of the few companies which offer indentured pupillages for technicians and technologists in the construction industry.

Each pupil is expected to undertake a programme of further education which will be planned to suit the individual. Pupils are sponsored on day-release, block-release and sandwich courses, leading to such qualifications as

B.Sc. (Hons.) in Building subjects, or the examinations of the Institute of Quantity Surveyors or Institute of Building. Most of the Company's present degree pupils are at the University of Aston in Birmingham, but other universities and colleges will be considered.

Pupils are paid their full annual salary regardless of whether they attend a part-time day or sandwich course. If it is necessary for them to live away from home for the period of their college work, they are paid a substantial lodging allowance, together with special travelling allowances for returning home periodically. All pupils receive book allowances for their particular course of study.

Enquiries to Training and Safety Manager, Unit Construction Co. Ltd, Unit House, Speke Boulevard, Liverpool L24 9LU.

Vauxhall Motors Ltd

The Company employs 36,000 people and is engaged in the design, development and manufacture of Vauxhall cars and Bedford commercial vehicles. The headquarters and main activities are centred on Luton with production plants situated at Dunstable, Bedfordshire, and Ellesmere Port in Cheshire.

Students aged 18–19 years, taking Mathematics and Physics G.C.E. 'A' level subjects are eligible to apply for this scheme. The student is responsible for obtaining his own university place through the U.C.C.A. The degree can be taken on either a 1:3:1 or thin sandwich basis. Most of the openings are for Mechanical or Production Engineering, but there is a limited number of vacancies for students to read Computer Science. Candidates who wish to take Computer Science should be taking two G.C.E. 'A' levels including Mathematics and the place on the degree course is arranged by the Company.

All tuition fees are paid by the Company, and the student recieves a salary throughout the industrial and academic training periods starting in the first year at approximately £810 per annum, rising to over £1500 per annum in the final year.

In addition, applications are invited from students taking Mathematics and Physics to take the four-year Luton College Associateship Diploma in Mechanical Engineering on a thin sandwich basis which gives exemption from C.E.I. Parts 1 and 2.

Applications for the degree scheme should be received before 1st December of the academic year in which the final examinations are taken and before 1st March for the Diploma scheme. These should be addressed to the Supervisor: Professional and Commercial Training, Vauxhall Motors Limited, P.O. Box 3, Luton LU2 0SY.

Westland Aircraft Ltd

The Company's Undergraduate Apprentices study for degrees or for the H.N.D. by thick or thin sandwich courses at universities, polytechnics or colleges of technology. A preliminary year in industry is regarded as almost essential and if, during this time, the apprentice's performance is of sufficiently high standard, the company will make a contribution towards full-time or sandwich education, to supplement the L.E.A. grant.

Each year apprentices may compete for the Westland University Scholarship. Tenable for three years at Cambridge University, it is awarded by the Group to a selected apprentice who has qualified to study for an honours degree through the Mechanical Sciences Tripos. The scholarship is not open for applications from those directly leaving school.

Enquiries to the Group Technical Training Officer, Westland Aircraft Ltd, Yeovil.

4 Training with the Armed Forces

The increasing complexity of modern weapons and equipment creates a proportionate demand for highly skilled officers to handle and develop them.

To this end the three Services have evolved their Engineering and Science Training Schemes which are outlined below. In addition they offer direct officer entry to university graduates, and also to those who possess professional qualifications and experience in the engineering and educational fields.

4 Training with the Armed Forces

THE ARMY

The Army provides 'A' level, degree and postgraduate training in Science and Engineering, and a pensionable career as a Regular Officer usually in one of the Technical Arms (Royal Artillery, Royal Engineers, Royal Corps of Signals, Royal Corps of Transport, Royal Army Ordnance Corps, and Royal Electrical and Mechanical Engineers).
The following schemes for training are available to those wishing to enter the Regular Army as engineers:

Training Scheme	Age Limits	Qualifications	Particulars of Study and Training	General Information
1 Royal Military Academy SANDHURST	17¾–20 (on 1st April or 1st September for the April or September entries)	Passes in five subjects of the G.C.E. (or equivalent) to include English Language, Mathematics and either a Science subject or a foreign language. Two passes should be at 'A' level	At present a two-year course in basic military training and academic instruction up to university entry standard, for which a diploma may be awarded	Cadets are commissioned on completion of this course as Regular Officers. There is a Scholarship Scheme available for this entry for boys aged between 15·5/12 and 16·5/12 to remain at school for their last two years studying for 'A' levels
2 Cambridge University Royal Military College of Science SHRIVENHAM	Approximately 21–23	G.C.E. 'A' levels in Mathematics, Physics and in some cases Chemistry	After some 18 months post Sandhurst experience in their Units, approximately 20 young officers are selected each year for the Mechanical Science Tripos at Cambridge University. In addition approximately 70 attend degree courses at the R.M.C.S. in Science or Engineering (Civil, Mechanical or Electrical)	Officers receive their Army Pay and allowances during their degree courses. University fees are paid by the Army Department
3 Army University Cadetships at universities, polytechnics or colleges of technology and also at the Royal Military College of Science SHRIVENHAM	Over 17½ and must expect to graduate before 25th birthday	Accepted for university etc. entry; G.C.E. 'A' levels in Mathematics, Physics and in some cases Chemistry for R.M.C.S. entry	(a) Most university or C.N.A.A. degree courses in the United Kingdom (b) Science or Engineering degrees at the R.M.C.S.	Successful candidates are granted probationary Regular Commissions for the period of their degree courses, which are confirmed after graduation. During their cadetships candidates receive pay and allowances and their university fees are paid
4 Post Graduate Courses		By selection from serving Regular Officers	Technical and Post Graduate Courses in the field of Science and Engineering are available at Shrivenham	
5 Short Service Commissioned Officers	Below 24th birthday on application for a Short Service Commission	G.C.E. 'A' levels in Mathematics, Physics and in some cases Chemistry	Degree Courses in Science or Engineering at the Royal Military College of Science, Shrivenham	20 vacancies each year are available for those S.S.C. officers wishing to convert to Regular Commissions
6 Welbeck College	15¾–17·2/12	G.C.E. 'O' level (or equivalent) standard in English Language, Mathematics, Science (which includes Physics) and some other subjects of which Chemistry and a language are desirable	2 year 6th Form Boarding School Course in 'A' level Mathematics and Science subjects in preparation for Sandhurst entry	Only candidates for certain technical Arms are eligible – Fees up to a maximum of £85 a term are paid according to parents' means

For further particulars write to: The Ministry of Defence, MP 1(A), Lansdowne House, Berkeley Square, London W1X 6AA

ROYAL AIR FORCE
The following schemes for training as an engineer are available to those wishing to enter the Royal Air Force:

Training Scheme	Age Limits	Qualifications	Particulars of Study and Training	General Information
R.A.F. University Cadetships in the Engineer Branch (*open competition*)	17½–23rd birthday	Candidates must have secured at least the provisional offer of a place at a university to read for an appropriate Engineering or Science degree	Normal university degree studies with membership of University Air Squadron; followed by 8 months orientation training after graduation	Candidates are appointed to commissions before commencing university studies and receive R.A.F. officer rates of pay and certain allowances. Tuition fees are paid by the Ministry of Defence. On graduation officers serve on permanent commissions in the Engineer Branch. There is also a Scholarship Scheme for boys of minimum age 15 years 8 months who remain at school for two years studying for 'A' levels. Scholarships lead to University Cadetship awards
Direct Entry Commissions (*Engineer Branch*)	17½–27th birthday	Appropriate G.C.E. passes including 'A' levels in Pure and Applied Maths. and Physics; or, a good O.N.C. in Mechanical or Electrical Engineering, together with G.C.E. 'O' level pass in English Language	Approximately 3 years officer and engineering training at R.A.F. College, Cranwell, in Mechanical or Electrical Engineering. Course leads to H.N.D. (Mechanical). Similar recognition is expected in the Electrical specialisation in the near future	Candidates are appointed to permanent commissions after approximately 4 months officer training. Professional training lasts for about 2 years and 8 months

For further particulars of the above schemes write to:
The Ministry of Defence, R 10 (R.A.F.), Adastral House, Theobald's Road, London WC1

4 Training with the Armed Forces

ROYAL NAVY
The following schemes for training as an engineer are available to those wishing to enter the Royal Navy:

Training Scheme	Age Limits	Qualifications	Particulars of Study and Training	General Information
Royal Naval College, Dartmouth	17–20½ years	Passes in five subjects of the G.C.E. including English Language and Chemistry at 'O' level, and Mathematics (Pure and Applied) at 'A' level; or acceptable equivalents in the S.C.E.	Successful candidates enter annually in September as Cadets, and, after one year at Dartmouth, followed by one year as a midshipman at sea will read for an Engineering (Electrical or Mechanical) Degree at the Royal Naval Engineering College, Manadon, Plymouth. A few will be selected to go to Cambridge for their degree course	There is a Scholarship scheme available for this entry, tenable for two years prior to entry, to assist boys to remain at school to obtain their 'A' levels
Royal Naval University Cadetships	Under 24 on 1st September of year of graduation	University Entry Qualifications	A course leading to a degree in electrical, electronic or mechanical engineering (or in science with suitable engineering subjects). In addition, candidates will be required to do a short naval familiarisation course before going to their university, and to undergo naval training during some of their vacations	Successful candidates are appointed as Acting Midshipmen for the period of the award, and receive a special rate of pay and education allowance. In addition, university tuition fees are paid by the Navy Department. On obtaining their degree, they serve in the Royal Navy on a full career commission
Cadet Entry to Short Service (16 year) Commissions	17–25th birthday	Five acceptable passes in G.C.E. to include Maths. (Pure and Applied) and Physics at 'A' level and English Language and Chemistry at 'O' level or acceptable equivalents in Scottish examinations or an O.N.C. in mechanical or electrical subjects showing passes at a good standard in four subjects plus G.C.E. 'O' level in English Language	Successful candidates, after a year's general Naval Training will go to the Royal Naval Engineering College, Manadon, Plymouth, to read for a degree in Mechanical or Electrical Engineering	The commission, which carries a pension, is for 16 years or to age 38, whichever is the later. In addition, there are good opportunities for transfer to a permanent commission

For further particulars of any of the above, write to:
Officer Entry Section, Old Admiralty Building, Whitehall, London SW1

5 The Professional Institutions

The Professional Institutions

Council of Engineering Institutions, 2 Little Smith Street, London SW1 (Tel. 01-799 3912)

C.E.I. was formed in 1962 and incorporated by Royal Charter in 1965. It is a federation of fifteen professional engineering Institutions and is constituted to promote and co-ordinate in the public interest the development of the science, art and practice of engineering.

Where appropriate the Council deals on behalf of the profession with Government departments and many other bodies which have similar aims.

The Constituent Members are listed below, with brief details of each.

The title 'Chartered Engineer' and the abbreviation 'C.Eng.' may be used by individual members of the constituent Institution who are fully qualified both academically and professionally. To become a Chartered Engineer it is necessary to be elected a corporate member of one of the Institutions. This requires:

(i) an academic qualification of degree standard;
(ii) a period of training and experience of at least three years;
(iii) a minimum age of 25.

The academic qualification can be satisfied by several means, as shown in the chart overleaf. The training and experience requirements differ between the Institutions, to whom all applications for information should be addressed.

The C.E.I. examination provides a route for those who have been unable to qualify for the engineering profession by means of a degree course. In particular, since the Council does not specify that a candidate's 'A' levels must be in science, it may suit the needs of the student who has not studied science at school and decides rather late that he wants to become an engineer.

For admission to Part 1 of the C.E.I. examination a candidate must have achieved a standard of education similar to that for admission to a degree course. The Part 1 examination consists of six three-hour papers in Applied Mechanics, Applied Electricity, Mathematics, Properties of Materials, Applied Thermodynamics, and Fluid Mechanics. More than seventy engineering subjects are available for Part 2, of which the candidate must make a selection and pass in five, plus a compulsory subject, 'The Engineer in Society'.

Students taking the H.N.D. in Engineering can, if they do well, gain exemption from Part 1 of the C.E.I. examination, and can then proceed to full professional qualification by taking Part 2. Most school leavers who do not go to university would start in this way. The few who wish to sit for C.E.I. Part 1 should consult their local technical college. There is only one course leading direct to C.E.I. Part 1 at present (at the Polytechnic of the South Bank), but the technical college may be willing to help.

Courses leading to the Council's Part 2 examination are available at a number of colleges up and down the country on a sandwich and full-time basis, and students should consult the Regional Advisory Council (see addresses on p. 101) or the professional Institution with which they wish to qualify.

Constituent Members of the Council of Engineering Institutions

The Royal Aeronautical Society, 4 Hamilton Place, London W1V 0BQ (Tel. 01-499 3515)

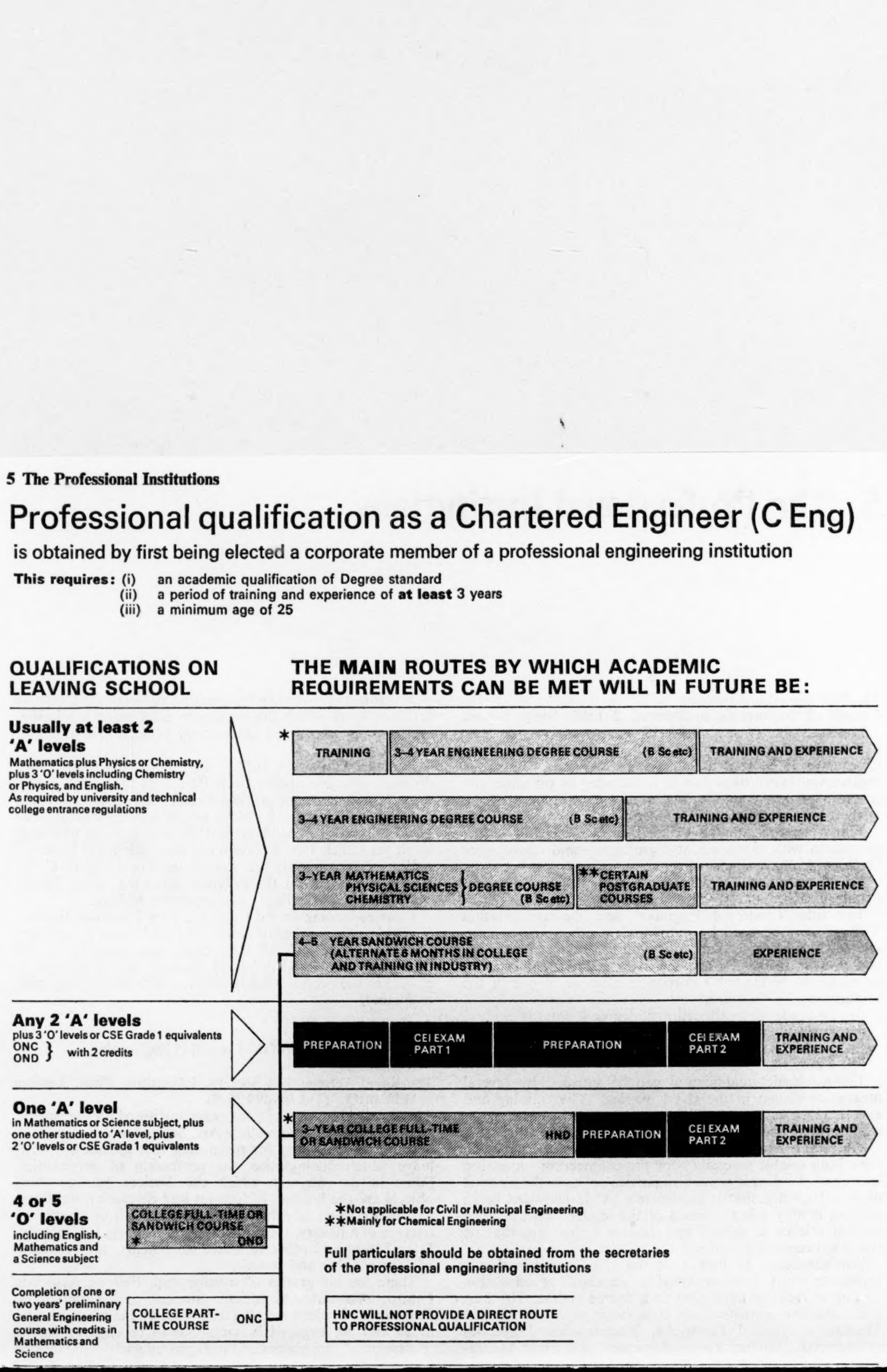
The Royal Aeronautical Society is constituted for the general advancement of Aeronautical Art, Science and Engineering and more particularly for promoting that species of knowledge which distinguishes the profession of aeronautics. Some of the ways in which the Society pursues these objects are the holding of lectures and discussion meetings, the organisation of exhibitions and conferences, the maintenance of a library, the publication of a Journal, Quarterly, Data Sheets and other technical documents, the provision of prizes, medals and awards.

There are six grades of membership, Fellow, Associate Fellow, Associate, Graduate, Student and Companion. Entrants to Student membership must be between the ages of 18 and 30, engaged in, or about to be engaged in the profession of aeronautics and have passed such examinations

Professional qualification as a Chartered Engineer (C Eng)

is obtained by first being elected a corporate member of a professional engineering institution

This requires: (i) an academic qualification of Degree standard
(ii) a period of training and experience of **at least** 3 years
(iii) a minimum age of 25


QUALIFICATIONS ON LEAVING SCHOOL
THE MAIN ROUTES BY WHICH ACADEMIC REQUIREMENTS CAN BE MET WILL IN FUTURE BE:
Usually at least 2 'A' levels
Mathematics plus Physics or Chemistry, plus 3 'O' levels including Chemistry or Physics, and English.
As required by university and technical college entrance regulations
* TRAINING
3–4 YEAR ENGINEERING DEGREE COURSE (B Sc etc)
TRAINING AND EXPERIENCE
3–4 YEAR ENGINEERING DEGREE COURSE (B Sc etc)
TRAINING AND EXPERIENCE
3–YEAR MATHEMATICS PHYSICAL SCIENCES CHEMISTRY } DEGREE COURSE (B Sc etc)
** CERTAIN POSTGRADUATE COURSES
TRAINING AND EXPERIENCE
4–5 YEAR SANDWICH COURSE (ALTERNATE 6 MONTHS IN COLLEGE AND TRAINING IN INDUSTRY) (B Sc etc)
EXPERIENCE
Any 2 'A' levels
plus 3 'O' levels or CSE Grade 1 equivalents
ONC OND } with 2 credits
PREPARATION
CEI EXAM PART 1
PREPARATION
CEI EXAM PART 2
TRAINING AND EXPERIENCE
One 'A' level
in Mathematics or Science subject, plus one other studied to 'A' level, plus 2 'O' levels or CSE Grade 1 equivalents
* 3–YEAR COLLEGE FULL-TIME OR SANDWICH COURSE HND
PREPARATION
CEI EXAM PART 2
TRAINING AND EXPERIENCE
4 or 5 'O' levels
including English, Mathematics and a Science subject
COLLEGE FULL-TIME OR SANDWICH COURSE * OND
Completion of one or two years' preliminary General Engineering course with credits in Mathematics and Science
COLLEGE PART-TIME COURSE ONC
*Not applicable for Civil or Municipal Engineering
**Mainly for Chemical Engineering
Full particulars should be obtained from the secretaries of the professional engineering institutions
HNC WILL NOT PROVIDE A DIRECT ROUTE TO PROFESSIONAL QUALIFICATION

as are acceptable to the Council. The standard of examination required is that of the General Certificate of Education, or some corresponding examination. Application for membership should be made on the prescribed form obtainable from the Society.

Examinations are conducted leading to the grade of Graduate, although by far the greater number obtain Graduate membership by exemption. Full details of the examinations and exemptions may also be obtained from the Secretary.

It is not possible for the Society to assist in obtaining appointments, although vacancies are advertised in the Journal, but advice on educational and other matters is always most willingly given to those considering entering the profession of Aeronautics.

The Institution of Chemical Engineers, 16 Belgrave Square, London SW1 (Tel. 01-235 3647)

As a qualifying body, the Institution of Chemical Engineers has a responsibility to prescribe courses of study, to hold examinations and to assess training and experience for those engaged in the discipline of chemical engineering.

The Institution is particularly concerned with university courses in chemical engineering leading to exemption from the Institution's own examination, and to fostering chemical engineering research. The Institution publishes papers and holds numerous meetings relating to the promotion of chemical engineering science and its application.

Students who have been accepted on approved courses in chemical engineering, and who are not less than 18 years of age, are eligible to join the Institution as Student members. Corporate membership is attained by obtaining professional training and responsible experience in chemical engineering after satisfying the academic requirements by one of the following routes:

(1) An approved full-time or sandwich chemical engineering degree course.
(2) An approved postgraduate diploma in chemical engineering after graduating in an allied discipline such as chemistry or mechanical engineering from a UK university.
(3) The examination of the Council of Engineering Institutions followed by the Design Project of the Institution.

The Institution has published a number of brochures which should help those considering chemical engineering as a career, including:

'Careers in Chemical Engineering'
'Regulations for Admission and the Examination'
'Your Institution'
'Chemical Engineering as a Profession'.

Further information can be obtained from the Institution.

The Institution of Civil Engineers, Great George Street, Westminster, London SW1 (Tel. 01-839 3611)

To become a professional civil engineer it is necessary to be elected a Member of the Institution of Civil Engineers (M.I.C.E.). Minimum age is 25. Both academic and practical training is necessary. For the former full-time higher education is best, leading to an exempting degree; for the latter, at least three years' practical experience is required, and is tested at a 'Professional Interview' by two senior engineers. The Council of the Institution consider that all men should become Students and subsequently Associate Members of the Institution; and this entitles them to use the library and to attend meetings in London or at Local Associations. The Institution maintains an Index of Engineers who are willing to provide practical training, and the Secretary of the Institution is always willing to advise boys who are interested in the prospects of civil engineering as a career.

The Institution of Electrical Engineers, Savoy Place, London WC2R 0BL (Tel. 01-240 1871)

The objects of the Institution are to promote the general advancement of electrical science and engineering and their applications, to act as a qualifying body and to serve as a regulating body for the profession of electrical engineering.

To qualify for Student membership, a candidate must be 17 years of age, be undergoing a regular approved course of study in electrical engineering and preferably hold the General Certificate of Education with passes at 'O' level in English Language and two other subjects at 'A' level in Mathematics and Physics.

The Institution does not administer an Appointments Register and is not permitted to function as an employment bureau, but a list is kept of concerns offering practical training to graduates and apprentices in electrical engineering which meet the Institution requirements, and these can be given to help candidates seeking employment.

Members of the staff are always pleased to advise the parents of students or the boys or girls themselves regarding education and training problems either by letter or by interview at the Institution in London.

The Institution of Electronic and Radio Engineers, 8-9 Bedford Square, London WC1B 3RG

The Institution was founded in 1925, incorporated by Royal

Charter in 1961. It is a qualifying body for chartered electronic and radio engineers and is devoted to serving their professional interests. The establishment of a separate institution for electronic engineers is an indication of the scope, importance and variety of careers offered by this branch of technology.

Entry to Student membership requires G.C.E. 'A' level Physics and Mathematics supported by 'O' level subjects. The academic requirement for corporate membership is a pass degree in an acceptable discipline, or success in the C.E.I. examination. After that a period of professional electronic engineering practice will qualify for corporate membership of the Institution (M.I.E.R.E.) and the C.Eng. award of the Council of Engineering Institutions.

The Institution has an Appointments Register; and the staff will gladly advise those at school or their parents on education for entry to this profession.

The Institute of Fuel, 18 Devonshire Street, Portland Place, London W1N 2AU (Tel. 01-580 7124)

The Institute of Fuel is an international organisation which is concerned with all forms of fuel and energy. It has been recognised by the Privy Council as the senior body for fuel and energy and its Royal Charter authorises professionally qualified members to be known as Chartered Fuel Technologists; suitably qualified members can also be registered as Chartered Engineers. The Institute provides the opportunity for members to keep up to date with advances in technology by circulating to them technical papers and news in fuel and energy in its monthly Journal and by arranging seminars, short courses and conferences at local, national and international level.

There are several grades of membership including Student membership. Examinations are conducted leading to corporate membership and also to a proposed new grade of membership at higher technician level called the Licentiateship. To qualify for these grades of membership, candidates, in addition to passing the appropriate examination, must have followed a programme of practical training and have obtained the appropriate professional and practical experience.

The Institute does not run an Appointments Register.

Further information and copies of the regulations may be obtained from the Education Officer of the Institute.

The Institution of Gas Engineers, 17 Grosvenor Crescent, London SW1 (Tel. 01-245 9811)

The Institution of Gas Engineers, which was founded in 1863, is the professional body which provides for the needs of qualified engineers, students and trainees in the gas industry. To qualify for corporate membership or fellowship and registration as a Chartered Engineer, a candidate needs as a minimum to have:

(a) Obtained a degree in an acceptable discipline or passed the common examination of the Council of Engineering Institutions (during a limited transitional period certain other qualifications will also be accepted); and
(b) followed a programme of practical training leading to a responsible position in the gas industry.

A candidate who is over 16, following an approved course of study in gas engineering and, where appropriate, receiving practical training in the industry, may qualify for admission as a Student. He may transfer to Associate Membership on successful completion of the course while obtaining the necessary practical experience.

Junior Gas Associations, which work closely with the Institution, exist all over the country and students take an active part in their meetings.

The Institution provides a variety of services for its members of all grades. Its monthly Journal, which is issued free to members, reproduces papers and discussions on technical subjects covering every aspect of gas engineering. Members keep in touch with the changing technology of the industry by attending meetings of the Institution or its courses and seminars.

The Institution does not maintain an Appointments Register but the Secretary will be pleased to advise boys interested in gas engineering as a career and put them in touch with Area Gas Boards who may have vacancies for trainees. Full details of the membership requirements may also be obtained from the Secretary.

The Institute of Marine Engineers, The Memorial Building, 76 Mark Lane, London EC3R 7JN (Tel. 01-481 8493)

Founded in 1889, the Institute has in the intervening years grown to become the accepted professional society for marine engineers. From the 1930's until recently it conducted examinations for membership but it now subscribes to the examinations and examination standards of the Council of Engineering Institutions of which it is a founder member.

One of its most important functions is its learned society activity and its interest in the education and training of marine engineers at all levels.

Meetings for the discussion of technical matters are held regularly throughout the autumn and winter months at the headquarters in London and at the numerous branches in this country and overseas. Conferences on many subjects are held on a regular annual basis.

The membership is international and there are Divisions of the Institute in Canada, India and Australia and New Zealand as well as Branches in many other countries overseas.

Information about the Institute and its requirements for membership can be obtained on application to the Director and Secretary.

The Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster, London SW1 (Tel. 01-930 7476)

The Institution of Mechanical Engineers has many functions including the encouragement of research and development and the widening of the knowledge of the science, art and craft of Mechanical Engineering.

To the young man or woman just entering the profession perhaps its most important aspect is that of a 'qualifying body'. That is, by satisfying the requirements for membership and being accepted as Member or Fellow, recognition of professional status can be achieved and with it the right to the style 'Chartered Engineer' (C.Eng.). The requirements for membership fall into three parts; academic training, professional training, and having attained a position of responsibility.

Academic requirements may be satisfied in a number of ways including a suitable university degree, C.N.A.A. degree, or an approved diploma.

Professional training is generally of about two years' duration in workshops, technical and commercial departments. Most large engineering concerns offer apprenticeship schemes which have been designed to meet membership requirements. Before embarking on a course of training, the student should take steps to ensure that it is adequate.

Student membership may be sought at the outset of a career to be followed by advancement to Graduate membership when education and professional training courses have been satisfactorily completed. As experience is gained, more and more responsibility can be expected to fall upon the capable young engineer until his work is such that the ambition of being accepted as a Member is achieved. He will now be a 'Chartered Mechanical Engineer' and, if working in the automobile industry, perhaps also a 'Chartered Automobile Engineer' in the same Institution.

Full details of membership requirements and of C.E.I. examinations may be obtained from the Secretary.

The Institution of Mining Engineers, 3 Grosvenor Crescent, London SW1 (Tel. 01-235 3691)

The Institution of Mining Engineers was founded in 1889 as a federation of much older district Institutes. It received its Royal Charter in 1915. It serves those engaged in all branches of the mining of stratified deposits, principally coal and ironstone, and its meetings provide an opportunity for free discussion by professional mining engineers. Its Journal, The Mining Engineer, is published monthly and contains papers and discussions on every aspect of coal mining and allied sciences. The Institution takes pride in the contribution of its members towards the promotion of safety and productivity in mining.

Student membership is open to all under the age of 25 who are engaged in training for mining engineering as a career. In addition, students are particularly catered for in the Junior Sections which most of the Federated Institutes comprising the Institution have set up in order to encourage young men to take an active interest in professional matters.

The Institution does not run an Appointments Register. Full particulars are available from the Secretary, who is also prepared to interview and advise those thinking of entering the profession.

The Institution of Mining and Metallurgy, 44 Portland Place, London W1N 4BR (Tel. 01-580 3802)

The Institution of Mining and Metallurgy was founded in 1892 and incorporated by Royal Charter in 1915. The aim of the Institution is to serve those engaged in the minerals industry and to advance the science and practice of:

(a) the exploration for and mining of minerals other than coal, and
(b) the metallurgy of metals other than iron.

To further these aims, the Institution publishes a monthly technical journal 'The Transactions of the Institution of Mining and Metallurgy' and bi-monthly 'IMM Abstracts', a comprehensive survey of world literature in the field. General meetings are held each month (except July and August) at which papers previously published in the Transactions are discussed. Visitors are welcome at these meetings.

A specialised library of some 30,000 volumes is maintained for the benefit of members and a technical information service is provided.

The Institution has some 4,000 members throughout the world engaged in economic geology, mining, mineral processing and extractive metallurgy. There are five grades of membership:

Honorary Member Member Associate Member	These are the corporate grades.
Affiliate	
Student	

Admission to the Institution as a Student Member is open to persons between the ages of 18 and 28, who are being educated for and who intend to follow a career in the

minerals industry. The academic standard required for transfer from Student to a corporate grade is that of a pass degree of a UK university in mining, mineral technology, metallurgy or geology. Other related disciplines can be accepted provided that the other requirements for transfer relating to professional experience have been met.

Entry to corporate membership of the Institution is mostly by exemption, applicants usually holding a degree or other equivalent qualification. All corporate members are entitled to the designation 'Chartered Engineer'.

The Institution takes an active interest in education for the minerals industry and has close connections with universities and colleges conducting appropriate courses but particularly with the Royal School of Mines and the Camborne School of Metalliferous Mining, Cornwall. To this end it administers several funds providing grants and awards from time to time to students engaged in postgraduate research. Awards are also made from the Institution's own funds to assist junior members of university staffs to travel overseas in connection with their teaching or research.

Further details about a career in the minerals industry and about admission to the Institution can be obtained from the Secretary.

The Institution of Municipal Engineers, 25 Eccleston Square, London SW1 (Tel. 01-834 5082)

The Institution was founded in 1873 and granted a Royal Charter in 1948. Membership is 10,082, almost all of whom are in the service of local authorities and public undertakings in the UK and overseas.

In the UK the surveyor of a local authority is a statutory officer under the Local Government Acts; most of these appointments are held by members of the Institution.

To become a corporate member a young man requires a good general education followed by technological education at a university or college of technology leading to a degree exempting from Parts 1 and 2 of the Council of Engineering Institutions' examination.

In addition he must be trained for at least two years under a scheme of training approved by the council and be 25 years of age.

Candidates who have not obtained a degree in engineering must pass the examinations of the Council of Engineering Institutions.

While studying for these examinations, or while at a university or college, and while undergoing training, young men should be enrolled as Student members of the Institution.

On completion of the training period all candidates without exception are required to pass Part 3 of the Institution's examination, which is a test of their professional competence and includes an interview.

When a candidate has satisfied these conditions he can be elected an Associate Member and registered as a Chartered Engineer, and after he has demonstrated his advancement in his profession by holding a position of recognised responsibility he can apply for transfer to the class of Member.

The Secretary of the Institution is always willing to advise boys who are interested in municipal engineering as a career.

The Royal Institution of Naval Architects, 10 Upper Belgrave Street, London SW1 (Tel. 01-235 4622)

The Institution of Naval Architects was established in 1860 to promote the improvement of ships and all that specially appertains to them and in its centenary year was granted the title of The Royal Institution of Naval Architects. A naval architect may be a designer or constructor of naval or merchant ships. He may also be engaged in related activities including ship research, operation and repair.

There are several grades of membership of the Institution including Junior membership. A candidate for admission as a Junior member must be between the ages of 18 and 25 years, have had a suitable education and produce evidence that he is undertaking an approved apprenticeship or educational course leading to a degree in Naval Architecture or Engineering.

The Institution is actively concerned with education and training of naval architects, and holds regular meetings for the presentation of papers on matters of interest to all those associated with the sea and ships.

Literature, advice and information on a career as a naval architect and on membership of the Institution may be obtained from the Secretary.

The Institution does not administer an Appointments Register.

The Institution of Production Engineers, 10 Chesterfield Street, Mayfair, London W1X 8DE (Tel. 01-499 5254)

The professional body of the Chartered Production Engineer is the Institution of Production Engineers.

The production engineer is during his formative years vitally interested in the technology of his industry, largely in establishing or improving processes, but investigation has shown that he quickly moves into the controlling of manufacturing enterprises and this is underlined by the

high proportion of the Institution corporate membership holding managerial positions. To this end he will use such 'tools' as cost control, systems analysis, control systems, operational research and programme evaluation and, in influencing human attitudes, ergonomics, industrial psychology and cybernetics.

Student membership is available for those from 18 years of age who have received a good general education and are following a form of practical training and technical education approved by Council. A degree in Production Engineering or Industrial Engineering is necessary for higher grades of membership.

The Assistant Secretary, Education, is willing to see at the above address, or otherwise to advise, any student interested in a career in Production Engineering.

The Institution does not keep an Appointments Register.

The Institution of Structural Engineers, 11 Upper Belgrave Street, London SW1 (Tel. 01-235 4535)

The main object of the Institution is to promote the science and art of structural engineering. Meetings are held at which original papers on all aspects of structural engineering are presented and discussed, and the proceedings are published in a monthly journal, 'The Structural Engineer', which is one of the principal media for the exchange of technical information between structural engineers throughout the world.

Branches and sections are established throughout the British Isles and in several Commonwealth countries. In certain centres there are also sections which organise papers, discussions, visits to works and social activities of particular interest to younger members.

The work of the Institution in the advancement of professional knowledge and practice is assisted by the wide scope and high standard of its examinations, which ensure that young entrants to the profession have the necessary training. Membership is in four grades, namely Student, Associate Member, Member and Fellow. A Student must be aged 17 to 24, must be studying structural engineering and have a basic standard of five passes in academic subjects in the G.C.E. examinations, including two at 'A' level, or equivalent qualifications approved by the Council. Members must have at least three years' practical experience, must be aged 25 or over and must have passed the Membership examination of the Institution. Fellowship is open only to experienced engineers occupying positions of responsibility. Members and Fellows have the right to style themselves 'Chartered Structural Engineer'.

All members may attend meetings and may use the library. They also receive a free copy of the Institution's Journal every month.

The Institution does not run an Appointments Register.

Further information and copies of the Regulations can be obtained from the Secretary.

Other Professional Bodies

The Institute of British Foundrymen, 137/139 Euston Road, London NW1 (Tel. 01-387 5171)

The Institute of British Foundrymen is the professional organisation for the cast metals industry, its higher grades of Fellow and Member being recognised under its Royal Charter by the authorisation to use the designations F.I.B.F. and M.I.B.F. 'Chartered Foundryman'.

The requirements for the professional grades of membership consist of specified examination qualifications of honours degree standard or equivalent plus an appropriate period of professional experience.

The objects of the Institute include the promotion of the intellectual welfare of its members by periodical meetings for the reading and discussion of scientific papers on subjects connected with the foundry and allied industries, and to initiate, conduct and supervise researches into the science and technology of the art of metal and alloy production, casting and working. Further, to organise and conduct or advise on means and systems of education.

A young man on entering the profession can qualify for admission as a Student and then proceed to the grades of Associate and Associate Member. On attaining the recognised examination qualifications and the requisite professional experience he can attain professional membership.

Anyone requiring further information should apply to the Secretary.

The Institute of Building, Englemere, King's Ride, Ascot, Berkshire (Tel. Ascot 23355)

The Institute, founded in 1834, is the professional institution for persons in building practice in a managerial, technical, commercial or administrative capacity and for those engaged in teaching building or in building research.

Its main function is to establish and maintain standards of competence and professional conduct.

Membership is personal to the individual and is open to duly qualified persons of any nationality.

Its examinations in technological, commercial and management subjects are taken by some 4,000 candidates annually at centres throughout Great Britain and overseas.

Further information concerning aims, activities and services is available from the Secretary.

5 The Professional Institutions

The Institute of Biology, 41 Queen's Gate, London SW7 (Tel. 01-589 9076)

The Institute of Biology has as its aims the advancement of the knowledge of biology by all means and the promotion of the professional standing, efficiency and usefulness of biologists.

Meetings are held in London and the major provincial centres on subjects of broad biological interest. Besides providing instruction, meetings offer opportunity for biologists from differing types of employment – university lecturing, school teaching, industrial research, Government service – to meet one another.

The Institute publishes 'Biologist' containing papers given at meetings, reviews of new biological books and news of interest to biologists. Members can also obtain at a reduced rate the 'Journal of Biological Education' and booklets in the series 'Studies in Biology'.

Advice is available to members on technical and professional matters. At its offices the Institute has a suitably equipped members' room for the convenience of members wishing to have a meeting-place or study in London.

Much valuable information has been gathered on training and is incorporated in a booklet 'Biology as a Career'. Reports of discussions on careers and suitable training appear in 'Biologist'. With the Department of Education and Science and the Scottish Education Department the Institute operates schemes for National Certificates in biology. The Institute conducts examinations for Membership (M.I.Biol.) and courses are available at some 20 approved colleges.

The Institute has a membership of 6,500. Full Membership is open to those with a first or second-class degree in a biological subject followed by three years' experience, or those who have passed the Institute's own examination. There are also categories of Fellow, Licentiate and Student.

Enquiries should be sent to the Education Officer.

The Royal Institute of Chemistry, 30 Russell Square, London WC1 (Tel. 01-580 3482)

The Royal Institute of Chemistry is the professional organisation for qualified chemists engaged in the advancement, teaching and practice of chemistry and in the applications of the science in industry and the public service. The main concerns of the Institute are to safeguard the standards of training, qualification and conduct within the profession, to look after the professional interests of members and to inform the public of the ways in which chemistry increasingly serves the community.

There are several grades of membership of the Institute including a grade of Student membership, which is open to all students of chemistry engaged on degree courses or on courses for the Institute's own Graduate membership examination, as well as those (including sixth-formers) who plan to enter such courses.

The Institute publishes information on careers and training in chemistry, including 'Looking to Chemistry for a Career' (gratis), 'Qualifications in Chemistry' (gratis) and 'Training Guide' (20p). Further information, including Regulations for admission to membership, will be sent on request.

The Society of Dyers and Colourists, P.O. Box 244, Perkin House, 82 Grattan Road, Bradford BD1 2JB, Yorkshire (Tel. 0274 25138)

The Society was founded in 1884 and granted a Royal Charter in 1963. It has a permanent staff and an elected Council. It has over 3,000 members in more than 63 countries maintaining close connections with the American Association of Textile Chemists and Colorists and being an active member of the International Federation of Associations of Textile Chemists and Colourists. The Society is a qualifying professional organisation with members in many branches of the coloration industry. It awards diplomas of Fellowship and Associateship (F.S.D.C. and A.S.D.C.) to suitably qualified members.

The Society promotes the advancement of the science and technology of colour by initiating and stimulating research and education, the advancement of theory, the creation and use of colouring matters, by publishing a monthly journal and text books and by holding lecture meetings, symposia, etc.

There are two classes of members: Corporate, including Fellows, Associates and Members Corporate, and Non-corporate, i.e. those who do not qualify for the former. There is also Junior membership (16–21 years) for those undergoing training in the practice of scientific coloration.

A.S.D.C. is awarded to candidates who pass the Society's Examination and satisfy Council in respect of their personal character and professional attainment.

The Institution of Engineering Designers, 38 Portland Place, London W1N 4AT (Tel. 01-580 8847-8-9)

The Institution was founded in 1946 to raise the status of designers in the engineering field and that of the more responsible draughtsmen engaged on engineering design work. It aims to do this by ensuring that design becomes an increasingly professional activity with its practitioners working ever more methodically to the advantage of their employers and to society at large. It has been and is involved, through conferences and publications. in promoting

design activity as a normal part of education at all levels, and is concerned that designers should be cognisant of modern trends in technology, organisation, social attitudes, etc. The Institution has a number of Branches in UK centres and publishes a monthly journal as well as providing representatives on relevant committees.

Membership in the various grades is based on an assessment of technological background and design ability, taking into account training, education and professional experience.

Further information is available from the General Secretary.

The Institution of Heating and Ventilating Engineers, 49 Cadogan Square, London SW1 (Tel. 01-235 7671)

The Institution was founded in 1897, for the promotion (for the benefit of the public in general), of the science and practice of Heating, Ventilating and Air Conditioning and such other engineering services as are associated with the built environment and with industrial processes.

The Institution has recently restructured the classes of membership so as to act as the qualifying body for the technician engineer and the technician, as well as the professional building services engineer. The young man deciding to enter the profession may join as a Student and proceed through the various examinations, training and experience requirements to qualify him as a professional engineer, corporate member of the Institution (M.I.H.V.E.). The technician engineer is accommodated in the class of Associate and the technician in the class of Licentiate. All three classes are controlled as qualifying classes of membership.

The Institution provides a number of services for its members of all grades including a monthly journal, regular meetings during the winter sessions, conferences and symposia, and technical publications required by the member in his field of engineering.

The Institution is joint sponsor with the Heating and Ventilating Contractors' Association of the Education Council for the Heating and Ventilating Industry and further information on apprenticeship schemes and suitable courses of study may be obtained from either the Secretary of the Institution at the above address or from the Secretary of the Education Council, 172 Buckingham Palace Road, London SW1.

The Institution of Metallurgists, 17 Belgrave Square, London SW1 (Tel. 01-245 9891)

The Institution of Metallurgists was founded in 1945 to cater for the needs of qualified metallurgists. Its functions are independent of but complementary to those of the Iron and Steel Institute and the Institute of Metals, which act as learned societies without qualifying functions.

The Institution's first objective is as stated in the Articles of Association 'to promote, encourage, advance and co-ordinate the study and science of metallurgy in all its aspects'. In pursuing this the Institution serves not only its membership, drawn from all varieties of metallurgical activity, but also the public interest.

The Institution provides a number of services for its members of all grades. There are a variety of publications offered at privileged prices to all grades of membership.

Students following recognised metallurgy courses, both full time and part time, may be enrolled in the Institution under the title of 'Enrolled Students' at a nominal charge, and as such obtain full benefits of membership.

In addition, the Institution conducts a remuneration survey of all members, triennially, and arranges refresher courses and local meetings.

Further details and forms of application can be obtained from the Registrar-Secretary.

The Institute of Physics, 47 Belgrave Square, London SW1 (Tel. 01-235 6111)

The Institute is the recognised body in the UK concerned with the professional and scientific interests of physicists. Membership of the senior grades of membership (M.Inst.P) or Fellowship (F.Inst.P) confers authoritative recognition of the holders within the profession. The basic professional grade is Associate Member for which an honours degree in physics or the equivalent is required. For those without a recognised degree or diploma the Institute has its own Graduateship examination and also co-operates in the running of National Certificate courses in Applied Physics, successful completion of which gains substantial exemption from the examination. There is a grade of Licentiateship for those working in physics and who have been educated to approximately the standard of a Pass or Ordinary degree or of Part 1 of the Graduateship examination. Students following a course leading to complete or partial exemption from the Graduateship examination may become student members.

A Student can probably best be guided on his future career by his Professor or Head of Department who will have personal knowledge of him. In cases of difficulty the Institute is always pleased to advise on the kind of work in which he is most likely to be successful. Later in his career it will offer assistance on conditions of service, salaries, postgraduate training, etc.

5 The Professional Institutions

Branches and specialist Groups have been formed for members with a shared interest based on a common locality or specialised knowledge. These, together with the Institute, arrange an extensive programme of conferences and meetings on a wide range of subjects in pure and applied physics, as well as on matters of general professional and educational interest. Six scientific journals are published, namely 'Journal of Physics' Parts A to F; and there is a bi-monthly journal 'Physics Education'. These are available to members at reduced rates. In addition the Institute's 'Physics Bulletin' which is issued monthly to members without charge contains articles of general interest to the non-specialist physicist. A Benevolent Fund is operated for members who may be in need of financial assistance.

The Plastics Institute, 11 Hobart Place, London SW1 (Tel. 01-245 9555)

The Plastics Institute is a technical society for those working in the plastics industry and it provides a series of monthly meetings in each of its nine local sections, a bi-monthly publication, a number of technical monographs, and an Examination Scheme at Technician and Technologist level in association with a number of approved colleges in various parts of the country.

Although it does not have an Appointment Register, the Institute will be very pleased to advise anyone who is interested in undertaking a course in Plastics, and enquirers should, in the first instance, get in touch with the Education Officer.

The Institute of Quantity Surveyors, 98 Gloucester Place, London W1H 4AT (Tel. 01-935 1859)

The Institute of Quantity Surveyors was founded in 1938 to provide a learned society solely for quantity surveyors but regardless of the section of the profession in which they practised or were employed. Thus no distinction is made between those employed on contracting or in professional offices or local or central government, and the Institute's 7,000 members are drawn from all sectors of the profession. This is important to the young person starting a career in quantity surveying as it not only allows him or her to start with either a contracting company, professional office or public service but permits him to move between the various sectors gaining invaluable experience whilst still in the 'training' grades of membership.

Student membership is open to anyone who has the required passes at 'A' and 'O' level in the General Certificate of Education or a Higher National Certificate or Diploma. Exemption from all or part of the Institute's three professional examinations may be granted to holders of certain degrees or diplomas in quantity surveying or building economics, etc., and certain qualifications awarded by other professional bodies.

The Institute provides many services for its members, including careers advice and appointment opportunities, and a journal which is the only regular publication in the UK intended solely for quantity surveyors. Full details of membership requirements and examinations may be obtained from the Secretary.

The Institution of the Rubber Industry, 4 Kensington Palace Gardens, London W8 (Tel. 01-299 9101)

The main objects of the Institution are to promote the development of rubber science and technology, to encourage the development of education for the training of managers, chemists, physicists, engineers, technologists and others engaged in the rubber industry; to promote the dissemination of the knowledge of rubber science and technology by meetings and the publication of its Transactions and other literature; to provide a means of association between persons interested in the wider aspects of all branches of the industry, including the production, investigation, manufacture, and applications of natural rubber, synthetic rubber and other elastomers.

Application for student membership should be made to the Secretary.

A small Appointments Register is kept and vacancies are advertised in the official Journal of the Institution.

The Textile Institute, 10 Blackfriars Street, Manchester 3 (Tel. Blackfriars 1457)

The object of the Institute is to advance the general interests of the textile industry especially in relation to the acquisition and application of scientific knowledge; to promote the profession and practice of textile technology; to devise and apply means for the better education of people in the industry and to grant diplomas and certificates of competency. It also arranges for the holding of meetings and reading of papers and the giving of lectures with subsequent discussion and publication.

There are six grades of membership from Ordinary to Companion of the Textile Institute.

By its examinations the Institute sets the standards for Chartered Textile Technologists, and it also keeps members abreast of the latest developments by means of the monthly publications. All members receive, monthly, 'The Textile Institute and Industry', and they can receive in addition the 'Journal of the Textile Institute' and 'Textile Abstracts', the

former being the world's leading publication in textile science and technology. The Institute publishes a wide range of textbooks for students at various levels, and maintains a comprehensive library.

Further information can be obtained from the General Secretary.

Institute of Work Study Practitioners, 9/10 River Front, Enfield, Middlesex (Tel. 01-366 3103)

The Institute was formed in 1965 by the amalgamation of the Institute of Work Study and the Institute of Incorporated Work Study Technologists, both of which had a history going back to the second world war.

The primary objects of the Institute are to create professional standards for the practice of work study; to provide a system of qualifying examinations to ensure recognition of those who aspire to the standards and ethics of the Institute; to ensure that those practising work study maintain those professional standards; to encourage research and development in work study; to be a focal point of the practice and wider use of work study in the UK and to collaborate with other bodies in similar fields of specialisation.

For Corporate membership, an applicant must be over 25 years of age, have at least three years' practical work study experience and have satisfied the Institute's examination requirements. Non-corporate membership is available for those who do not meet the full requirements. The pre-entry requirement for the examination is at least three G.C.E. 'O' levels (or their equivalent) including English and Mathematics.

Work study is a very practical discipline and is one of the principal techniques concerned with increasing productivity, i.e. advising management how to make the best use of the three real resources of material, manpower and capital equipment. It is essential, therefore, that sound training and experience go hand in hand with examinations, and the best method of entry into the profession is to join a company willing and able to provide the necessary training and experience.

Further details are available from the Director and General Secretary of the Institute.

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(Firms grouped under the branch of engineering or science in which training is offered)

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Westland Aircraft Ltd	51	72
Agricultural Engineering		
Ransomes, Sims & Jefferies Ltd	46	—
The following firms making tractors or other agricultural machinery offer training in Mechanical Engineering:		
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Ford Motor Co. Ltd	20	66
R. A. Lister & Co. Ltd	35	—
Marshall-Fowler Ltd	37	—
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British Overseas Airways Corporation	9	9
Architecture		
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The Dove Group (Technician only)	16	—
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Pressed Steel Fisher Ltd (see British Leyland)	6, 7	60
Rolls-Royce Motors Ltd (Crewe)	47	—
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Reed International Ltd	46	—
Shell Research Ltd	48	—
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Pfizer Ltd	43	—
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Reed International Ltd	46	—
The Research Association of British Paint, Colour and Varnish Manufacturers	47	—
Rolls-Royce Motors Ltd (Crewe)	47	—
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Aveling-Barford Ltd (see British Leyland)	8	60
Birmid Qualcast (Foundries) Ltd	3	—
BP Chemicals International Ltd	3	60
British Aircraft Corporation Ltd	4	—
British Leyland (Austin-Morris) Ltd	6	60
British Overseas Airways Corporation	9	9
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Brush Electrical Engineering Co. Ltd	12	—
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The Plessey Co. Ltd	44	—
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Pye-T.M.C. Ltd	45	—
The Pyrene Co. Ltd	46	—
Ransomes Sims & Jefferies Ltd	46	—
Reed International Ltd	46	—
A. Reyrolle & Co. Ltd	47	70
The Rover Co. Ltd (see British Leyland)	7	60
Salford Electrical Instruments Ltd (see G.E.C.)	27	—
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Smiths Industries Ltd	49	—
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G.E.C. Electrical Projects Ltd	26	—
G.E.C. Elliott Automation Ltd	25	—
G.E.C. Elliott Industrial Controls Ltd	25	—
G.E.C. Elliott Precision Controls Ltd	25	—
G.E.C. Elliott Process Automation Ltd	25	—
G.E.C. Elliott Process Instruments Ltd	25	—
G.E.C. Elliott Traffic Automation Ltd	26	—
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Pye Unicam Ltd	45	—
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Telephone Cables Ltd (see G.E.C.)	26	—
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Environmental Engineering
see **Heating and Ventilating**

Food Technology		
Cadbury Schweppes Ltd	13	64
H. J. Heinz Co. Ltd	30	66

(Many firms not mentioned in this brochure support students on the four-year sandwich course in this subject at the National College of Food Technology, St George's Avenue, Weybridge, Surrey. The College is a department of the University of Reading and the course leads to a B.Sc honours degree. Entry requirements are G.C.E. at 'A' level in two science subjects, one of which must be chemistry or physics, and at 'O' level in at least three subjects which must include English, mathematics and a science. Chemistry or physics if not passed at 'A' level should have been studied to that level. A list of companies and research establishments which co-operate with the College by providing facilities for industrial training will be found in the College prospectus.)

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Cincinnati Milacron Ltd	14	—
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Mather & Platt Ltd	37	—

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Imperial Chemical Industries Ltd	32	—
George Kent Ltd	34	—
Kodak Ltd (Trade apprenticeship)	34	—
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Ford Motor Co. Ltd	20	66
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British Insulated Callender's Cables Ltd	5	—
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Delta Metal Co. Ltd	15	64
Elliott Automation Ltd (see G.E.C.)	23	—
English Electric-A.E.I. Machines Ltd (see G.E.C.)	22	—
General Electric Co. Ltd	21-27	21
G.E.C.-A.E.I. Electronics Ltd	23	—
G.E.C. Electrical Projects Ltd	26	—
G.E.C. Elliott Precision Controls Ltd	25	—
G.E.C. Elliott Process Automation Ltd	25	—
G.E.C. Elliott Process Instruments Ltd	25	—
G.E.C. Power Engineering Ltd	21	—
Hawker Siddeley Aviation Ltd	29	—
Hirst Research Centre (G.E.C.)	25	—
IBM United Kingdom Ltd	31	67
International Computers Ltd	33	—
Joseph Lucas Ltd	37	—
The Marconi Co. Ltd (see G.E.C.)	22	—
Marconi Elliott Computer Systems Ltd (see G.E.C.)	26	—
Marconi Space and Defence Systems Ltd (see G.E.C.)	23	—
The Plessey Co. Ltd	44	—
Post Office	44	69
Shell Research Ltd	48	—
Thorn Electrical Industries Ltd	49	—
The Wellcome Foundation Ltd	51	—
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Mechanical Engineering		
A.E.C. Ltd (see British Leyland)	8	60
A.E.I. Cables Ltd (see G.E.C.)	27	—
Aiton & Co. Ltd	1	—
Albion Motors Ltd (see British Leyland)	8	60
Alcan Booth Industries Ltd	1	—
Allen West-EAC Ltd	1	—
W. H. Allen, Sons & Co. Ltd	1	—
Alvis Ltd (see British Leyland)	7	60
Andrews-Weatherfoil Ltd	2	—
The A.P.V. Co. Ltd	2	—
Associated Automation Ltd (see G.E.C.)	26	—
Automotive Products Group	2	59
Aveling-Barford Ltd (see British Leyland)	8	60
W. & T. Avery Ltd	3	—
Birmid Qualcast (Foundries) Ltd	3	—
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Dennis Brothers Ltd (Technician only)	16	—
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The Dove Group (Technician only)	16	—
Dowty Group Ltd	16	—
Dunford Hadfields	17	—
Dunlop Ltd	17	—
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English Electric-A.E.I. Turbine Generators Ltd (see G.E.C.)	21	—
English Electric Diesels Ltd (see G.E.C.)	22	—
English Electric Fusegear Ltd (see G.E.C.)	27	—
English Electric Reactor Division (see G.E.C.)	22	—
English Electric, Stafford (see G.E.C.)	22	—
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J. H. Fenner & Co. Ltd	20	—
Ferranti Ltd, Edinburgh	20	20
Ferranti Ltd, Hollinwood	20	—
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G.E.C. Elliott Control Valves Ltd	25	—
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G.E.C. Elliott Precision Controls Ltd	25	—
G.E.C. Elliott Process Instruments Ltd	25	—
G.E.C. Power Engineering Ltd	21	—
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Greater London Council	28	66
Guest, Keen & Nettlefolds Group of Companies	29	—
G. N. Haden & Sons Ltd	29	—
Hamworthy Engineering Ltd	29	—
Hawker Siddeley Aviation Ltd	29	—
Hawker Siddeley Power Transformers Ltd	30	—
Hayward Tyler & Co. Ltd	30	66
H. J. Heinz Co. Ltd	30	66
Alfred Herbert Ltd	31	—
Holman Bros. Ltd	31	—
Hoover Ltd	31	—
Imperial Chemical Industries Ltd	32	—
Imperial Metal Industries (Kynoch) Ltd	32	—
IBM United Kingdom Ltd	31	67
International Computers Ltd	33	—
Jaguar Cars Ltd (see British Leyland)	7	60
Johnson Matthey & Co. Ltd	33	—
A. A. Jones & Shipman Ltd	33	—
Kodak Ltd	34	—
Laurence Scott & Electromotors Ltd	35	—
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R. A. Lister & Co. Ltd	35	—
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Marconi Space and Defence Systems Ltd (see G.E.C.)	23	—
Marley Tile Co. Ltd	37	—
Marshall-Fowler Ltd	37	—
Mather & Platt Ltd	37	—
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Permali Ltd	43	—
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The Plessey Company Ltd	44	—
Post Office	44	69
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Prestcold Ltd (see British Leyland)	9	60
Priestman Bros. Ltd	45	—
Pye-T.M.C. Ltd	45	—
The Pyrene Co. Ltd	46	—
Raleigh Industries Ltd	46	—
Ransome Hoffman Pollard Ltd	46	—
Ransomes, Sims & Jefferies Ltd	46	—
Reed International Ltd	46	—
Renold Ltd	47	—
A. Reyrolle & Co. Ltd	47	70
Rolls-Royce Motors Ltd (Crewe)	47	—
The Rover Co. Ltd (see British Leyland)	7	60
Ruston-Bucyrus Ltd	48	—
Ruston Paxman Diesels Ltd (see G.E.C.)	22	—
Scammell Lorries Ltd (see British Leyland)	9	60
Shell Research Ltd	48	—
Short Bros. & Harland Ltd	48	—
Simms Motor Units Ltd	49	—
Smiths Industries Ltd	49	—
Standard Ironworks (see G.E.C.)	22	—
Telephone Cables Ltd (see G.E.C.)	26	—
Thorn Electrical Industries Ltd	49	—
Triumph Motor Co. Ltd (see British Leyland)	7	60
Tube Investments Ltd	49	—
Vauxhall Motors Ltd	50	72
Vosper Thornycroft Ltd	50	—
Weir Pumps Ltd	51	—
Westinghouse Brake & Signal Co. Ltd	51	—
Westland Aircraft Ltd	51	72
Wickman Machine Tool Manufacturing Co. Ltd	52	—
Wilkinson's Rubber Linatex Ltd	52	—
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British India Steam Navigation Co. Ltd	5	—
J. & J. Denholm Ltd	15	—
Hunting & Son Ltd	31	—
P. & O. Lines Ltd	42	—
Metallurgy		
Alcan Booth Industries Ltd	1	—
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Birmid Qualcast (Foundries) Ltd	3	—
Brico Engineering Ltd	4	—
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The British Non-Ferrous Metals Research Association	9	—
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David Brown Group	12	—
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Pfizer Ltd	43	—
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BP Chemicals International Ltd	3	—
British Aircraft Corporation	4	—
British Insulated Callender's Cables Ltd	5	—
British Leather Manufacturers' Research Association	5	—
British Petroleum Co. Ltd	10	61
British Steel Corporation	11	—
Cambridge Scientific Instruments Ltd	13	—
C.A.V. Ltd	13	—
Chance Bros. Ltd	13	—
J. & P. Coats Ltd	14	—
Dunlop Ltd	17	—
Electric Power Storage Ltd	18	—
Elliott Automation Ltd (see G.E.C.)	23	—
EMI Ltd	19	66
The English Electric Valve Co. Ltd (see G.E.C.)	24	—
Ferranti Ltd, Hollinwood	20	—
General Electric Co. Ltd	21-27	21
G.E.C.-A.E.I. Electronics Ltd	23	—
G.E.C. Elliott Automation Ltd	25	—
G.E.C. Elliott Precision Controls Ltd	25	—
G.E.C. Elliott Process Automation Ltd	25	—
G.E.C. Elliott Process Instruments Ltd	25	—
Greater London Council	28	66
Hawker Siddeley Aviation Ltd	29	—
Hirst Research Centre (see G.E.C.)	25	—
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International Computers Ltd	33	—
Kodak Ltd	34	—
Joseph Lucas Ltd	37	—
The Marconi Co. Ltd (see G.E.C.)	22	—
Marconi Elliott Computer Systems Ltd (see G.E.C.)	26	—
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Production Engineering		
Albion Motors Ltd (see British Leyland)	8	60
Alcan Booth Industries Ltd	1	—
W. H. Allen, Sons & Co. Ltd	1	—
Allen West-EAC Ltd	1	—
Alvis Ltd (see British Leyland)	7	60
Associated Automation Ltd (see G.E.C.)	26	—
A.E.C. Ltd (see British Leyland)	8	60
The Automotive Products Group (The Lockheed Hydraulic Brake Co. Ltd and Associated Companies)	2	59
Aveling-Barford Ltd (see British Leyland)	8	60
W. & T. Avery Ltd	3	—
Birmid Qualcast (Foundries) Ltd	3	—
Brico Engineering Ltd	4	—
British Aircraft Corporation Ltd	4	—
British Leyland (Austin-Morris) Ltd	6	60
British Rail	10	62
British Steel Corporation	11	—
British Timken	12	—
British United Shoe Machinery Co. Ltd	12	—
Brush Electrical Engineering Co. Ltd	12	—
Cambridge Scientific Instruments Ltd	13	—
C.A.V. Ltd	13	—
Chance Bros. Ltd	13	—
Chrysler United Kingdom Ltd	14	—
Cincinnati Milacron Ltd	14	—
Coventry Gauge and Tool Co. Ltd	14	—
Delta Metal Co. Ltd	15	64
Dennis Brothers Ltd (Technician only)	16	—
Dorman Diesels Ltd (see G.E.C.)	22	—
Dowty Group Ltd	16	—
Dunlop Ltd	17	—
Eastern Coach Works Ltd (see British Leyland)	8	60
Electric Power Storage Ltd	18	—
Elliott Automation Ltd (see G.E.C.)	23	—
Elliott Flight Automation Ltd (see G.E.C.)	24	—
English Electric A.E.I. Machines Ltd (see G.E.C.)	22	—
English Electric Diesels Ltd (see G.E.C.)	22	—
English Electric Fusegear Ltd (see G.E.C.)	27	—
Ford Motor Co. Ltd	20	66
General Electric Co. Ltd	21-27	21
G.E.C.-A.E.I. Electronics Ltd	23	—
G.E.C.-A.E.I. Telecommunications Ltd	24	—
G.E.C. Electrical Projects Ltd	26	—
G.E.C. Elliott Process Automation Ltd	25	—
G.E.C. Henley Ltd	27	—
G.E.C. Power Engineering Ltd	21	—
Giddings & Lewis-Fraser Ltd	27	—
Guest, Keen & Nettlefolds Group of Companies	29	—
Hamworthy Engineering Ltd	29	—
Hawker Siddeley Aviation Ltd	29	—
Hawker Siddeley Power Transformers Ltd	30	—
Alfred Herbert Ltd	31	—
Holman Bros. Ltd	31	—
Hoover Ltd	31	—
Jaguar Cars Ltd (see British Leyland)	7	60
Johnson Matthey & Co. Ltd	33	—
A. A. Jones & Shipman Ltd	33	—
Kodak Ltd	34	—
Leyland Motors (see British Leyland)	8	60
Joseph Lucas Ltd	37	—
Marconi Elliott Computer Systems Ltd (see G.E.C.)	26	—
Marconi Instruments Ltd (see G.E.C.)	24	—
The Marconi Co. Ltd (see G.E.C.)	22	—
Marley Tile Co. Ltd	37	—
Marshall-Fowler Ltd	37	—
Mather & Platt Ltd	37	—
Maudslay Motor Co. Ltd (see British Leyland)	8	60
Mawdsley's Ltd	37	—
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Platt International Ltd	44	69
The Plessey Co. Ltd	44	—
Pressed Steel Fisher Ltd (see British Leyland)	7	60
Prestcold Ltd (see British Leyland)	9	60
Pye Unicam Ltd	45	—
Raleigh Industries Ltd	46	—
Ransome Hoffman Pollard Ltd	46	—
Ransomes, Sims & Jefferies Ltd	46	—
Rolls-Royce Motors Ltd (Crewe)	47	—
The Rover Co. Ltd (see British Leyland)	7	60
Ruston-Bucyrus Ltd	48	—
Ruston Paxman Diesels Ltd (see G.E.C.)	22	—
Simms Motor Units Ltd	49	—
Smiths Industries Ltd	49	—
Standard Ironworks (see G.E.C.)	22	—
Telephone Cables Ltd (see G.E.C.)	26	—
Thorn Electrical Industries Ltd	49	71
Triumph Motor Co. Ltd (see British Leyland)	7	60
Tube Investments Ltd	49	—
Vauxhall Motors Ltd	50	72
Weir Pumps Ltd	51	—
Westinghouse Brake & Signal Co. Ltd	51	—
Westland Aircraft Ltd	51	—
Wickman Machine Tool Mfg. Co. Ltd	52	—
Wilkinson's Rubber Linatex Ltd	52	—
Quarry Management		
E.C.C. Quarries Ltd	17	17
Rubber Technology		
Dowty Group Ltd	16	—
Dunlop Ltd	17	—
J. H. Fenner & Co. Ltd	20	—
Imperial Chemical Industries Ltd	32	—
Michelin Tyre Co. Ltd	39	67
Yarsley Testing Laboratories Ltd	53	—
Shipbuilding		
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Bovis Ltd	3	—
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Guest, Keen & Nettlefolds Group of Companies	29	—
Surveying		
Greater London Council	28	—
John Laing & Son Ltd	34	—
Unit Construction Co. Ltd	50	71
George Wimpey & Co. Ltd	52	—
Telecommunications		
The British Broadcasting Corporation	4	—
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Fairey Hydraulics Ltd	19	—
General Electric Co. Ltd	21-27	21
The Marconi Co. Ltd (see G.E.C.)	22	—
The Plessey Co. Ltd	44	—
Post Office Engineering Department	44	69
Pye-T.M.C. Ltd	45	—
Textile Technology		
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INDUSTRIAL AWARDS IN NON-TECHNICAL SUBJECTS

The following offer full support for degree courses in subjects not classified in the Index above:

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The Automotive Products Group	Economics or allied subjects	59
British Petroleum Co. Ltd	Business studies, Economics	61
The Brockhouse Scholarship: Birmingham University	Any subject	60
Burmah Oil Trading Ltd	Economics and Administration	63
Cadbury Schweppes Ltd	Technical or non-technical subjects (for own employees)	64
Delta Metal Co. Ltd	Natural sciences or arts subjects	64
IBM United Kingdom Ltd	Any subject	67

7 Bibliography

Listed below are some essential reference books (most of which will be found in school careers rooms) for those intending to take higher or further education courses in engineering or science subjects, and some general careers literature relating to these subjects. Addresses of principal suppliers are given on p. 105.

1 HIGHER AND FURTHER EDUCATION

(a) ESSENTIAL REFERENCE BOOKS

Compendium of University Entrance Requirements published annually by the Association of Commonwealth Universities: price 90p from Lund Humphries, The Country Press, Priestman Street, Bradford BD8 8BT, Yorkshire. Contains details of general entrance requirements and course requirements of all UK universities. (There are no course requirements at Oxford or Cambridge and students should consult **Admission to Oxford** and the **Cambridge Admissions Prospectus** obtainable from the Oxford Colleges Admissions Office, 58 Banbury Road, Oxford, and Cambridge University Press, 200 Euston Road, London NW1, respectively: free of charge.)

A Compendium of Advanced Courses in Technical Colleges: price 50p: from the Regional Advisory Council for Technological Education, London and Home Counties, Tavistock House South, Tavistock Square, London WC1H 9LR. Lists all C.N.A.A. and London External degree courses in Polytechnics and Colleges of Technology, both full-time and sandwich; also courses leading direct to qualifications of the professional bodies, H.N.D. courses and College Diploma courses. Advanced courses only are included.

Compendium of Degree Courses: published annually by the Council for National Academic Awards, 3 Devonshire Street, London W1N 2BA: free of charge.
Lists all C.N.A.A. degree courses arranged under subjects, and supplements the **Compendium of Advanced Courses** in that it gives detailed entrance requirements and an outline of the syllabus of each course.

How to apply for Admission to a University: published annually by the Universities Central Council on Admissions, P.O. Box 28, Cheltenham GL50 1HY: price 20p post free.

Degree Course Guides: published by the Careers Research and Advisory Centre, Bateman Street, Cambridge CB2 1LZ, revised every two years. The Guides cover both university and C.N.A.A. degrees and are available on individual subjects including Mechanical Engineering (45p); Civil Engineering (50p); Chemical Engineering (45p); Electrical and Electronic Engineering (50p); Mining Engineering (45p); Production Engineering (45p); Biochemistry and Molecular Biology (45p); Biology, Botany and Zoology (45p); Geology and Environmental Sciences (45p); Chemistry (50p); Mathematics, Computer Science and Statistics (50p); Pharmacy and Pharmacology (45p); Physics (50p); Metallurgy and Materials Science (45p).

These Guides give an outline of the curriculum of each degree course, show what special topics may be studied, and how the courses differ from each other. The information they contain is not to be found elsewhere, except by a study of individual university prospectuses.

Directory of Further Education: published annually by Cornmarket Press: price £2·50

Contains a list of courses at all levels in colleges outside universities, arranged under regions. Only courses held entirely in the evenings are omitted. It is particularly useful for looking up O.N.C., O.N.D., H.N.C. and City and Guilds courses which do not appear in the other compendia and is the easiest way of tracking down courses in obscure subjects such as yacht design. It collates the information about day release and part-time courses issued by the *Regional Advisory Councils* for their own areas. Fuller particulars can be obtained direct from the Councils, the addresses of which are given below:

ADDRESSES OF REGIONAL ADVISORY COUNCILS FOR FURTHER EDUCATION

London and Home Counties Regional Advisory Council for Technological Education,
Tavistock House South, Tavistock Square, London WC1
Telephone 01-387 5484/5

7 Bibliography

Southern Regional Council for Further Education,
9 Bath Road, Reading, Berkshire
Telephone Reading 52120

Regional Council for Further Education for the South West,
Kent House, 31/35 Prince Street, Bristol BS1 4PH
Telephone Bristol 25626

West Midlands Regional Advisory Council for Further Education,
Pitman Buildings, 161 Corporation Street, Birmingham 4
Telephone 021-235 9944, Ext. 2628

Regional Advisory Council for the Organisation of Further Education in the East Midlands,
Robins Wood House, Robins Wood Lane, Aspley,
Nottingham NG8 3NH
Telephone Nottingham 293291

East Anglian Regional Advisory Council for Further Education,
County Hall, Norwich NOR 49A
Telephone Norwich 22288, Ext. 5028

Yorkshire Council for Further Education,
Bowling Green Terrace, Leeds LS11 9SX
Telephone Leeds 20883

North-Western Regional Advisory Council for Further Education,
36 Granby Row, Manchester M1 6WD
Telephone 061-228 1033

Northern Advisory Council for Further Education,
5 Grosvenor Villas, Grosvenor Road,
Newcastle upon Tyne NE2 2RU
Telephone Newcastle 81-3242/3

Welsh Joint Education Committee,
30 Cathedral Road, Cardiff CF1 9YH
Telephone Cardiff 41253

(b) OTHER PUBLICATIONS USEFUL TO STUDENTS

Which University? published annually by Cornmarket Press: price £2·50. A good quick reference book to degree courses and qualifications required, and useful for description of universities themselves, their buildings, facilities and environment.

CRAC/CBI Yearbook of Education and Training Opportunities published by Careers Research and Advisory Centre: Volume 1 **Education and Training,** Volume II **Advanced Courses:** each price £2·10: revised annually.

Gives details of education and training both technical and commercial with many employers and professional organisations; and particulars of advanced courses (from H.N.C. to degree) in a large number of polytechnics and colleges, together with much general information and advice.

Science Degree Choice: published by the Careers Research and Advisory Centre: price 25p.
An introduction to choosing a degree subject and university courses available in each subject area, what to consider in choosing a course, how to apply, etc.

Higher Education and You, a Guide for School Leavers (in Scotland): obtainable from the Scottish Education Department, 8 George Street, Edinburgh: free of charge.

The Year Book of Technical Education and Training for Industry: edited by H. C. Dent, published by A. & C. Black: price £2·50.

A vast amount of information concerning universities, polytechnics, colleges of further education, agricultural colleges, industrial organisations, professional and examining bodies; outlines the work of the various bodies promoting technical education, from the Department of Education and Science and the Council for National Academic Awards to the Royal Commission for the Exhibition of 1851. Has a large section describing the scope of different industries and the opportunities they offer. Very useful for looking up names of heads of university and college departments, and the addresses and telephone numbers of almost anybody connected with technical education and industrial training.

Signposts to Higher Education: published by Department of Education and Science, Curzon Street, London W1Y 8AA: free of charge, revised annually.

Advice on sources of information about courses in universities, polytechnics and colleges, entry requirements and grants.

On Course: published three times a year by Department of Education and Science: free of charge.

A journal of technical and further education covering new courses in these fields, providing lists of existing courses on particular subjects, on individual polytechnics and colleges and much information about F.E. developments in the regions.

After 'A' levels: published by Department of Education and Science: free of charge.

An introduction to opportunities outside the universities for 'A' level school leavers.

What next after 'A' levels?: published annually by Department of Education and Science: free of charge.

Explains how to use the Further Education Information Service which operates every summer to let students know which colleges and polytechnics still have late vacancies for the next academic year.

Engineering Science at the University: (3rd edition) published by Oxford University Department of Education, Norham Gardens, Oxford OX2 6PY: price £1·25.

Grants to Students 1: published by Department of Education and Science: free of charge.

Details of the grant position of candidates for first degree courses; also deals with grants for postgraduate teacher training courses.

Guide to Students' Allowances: published annually by Scottish Education Department, 8 George Street, Edinburgh: free of charge.

Grants Handbook: published annually by National Union of Students, 3 Endsleigh Street, London WC1: price 40p.

Commonwealth Universities Yearbook: published by Association of Commonwealth Universities: revised annually: price £11 post free. Available for reference in most public libraries.

Study Abroad: published by U.N.E.S.C.O.: price £1·80 from H.M.S.O.

Details of foreign universities, their courses, method of application, and scholarships available.

While you Wait: published by the Careers Research and Advisory Centre: free of charge.

Temporary Occupations and Employment: published by Public Schools Appointments Bureau, 17 Queen Street, Mayfair, London W1X 8BL: price 15p.

Both the above are of interest to students wishing to occupy a year between school and university. The CRAC publication surveys possibilities at home and abroad more exhaustively, but the P.S.A.B. publication contains more information about actual employment opportunities with firms in this country.

Agricultural Education (AE5): published by the Department of Education and Science: free of charge.

A comprehensive list of courses at all levels in agriculture, from farm institute to university, including courses in agricultural engineering.

New Computer Courses: published by the National Computing Centre Ltd, Quay House, Quay Street, Manchester M3 3HU: price £1·50.

On Course Bulletin No. 2: published by the Department of Education and Science: free of charge.

Information on computer courses at all levels in technical colleges and polytechnics.

Teacher Training Opportunities for Science, Mathematics and Technology Graduates: published by the Royal Society, 6 Carlton House Terrace, London SW1: free of charge.

Should save those wanting to teach science or technical subjects a good deal of dredging elsewhere. It covers courses in universities and colleges of education and provides much information about course-content.

2 GENERAL INFORMATION ON ENGINEERING AND SCIENCE CAREERS

C.Y.E.E. Careers Guide: published by H.M.S.O. for the Central Youth Employment Executive: revised annually: £1·12½.

The basic book, to be found in all careers rooms, and an excellent starting point for investigating most careers.

Careers Encyclopaedia: edited by Henry R. Jackson, published biennially by Cassell & Co. Ltd, price £2·50.

Another useful quick-reference book on careers in general; perhaps not always specific enough in its information, but gives useful leads to further enquiries.

Choice of Careers Series: published by H.M.S.O. for the C.Y.E.E.: obtainable through booksellers or from H.M.S.O., 49 High Holborn, London WC1V 6HB.

Titles in the series which are relevant to engineering and science careers are:

No.
19 Foundry Industry (11p)
60 Engineering Draughtsman (7½p)
62 Pharmacy (7½p)
92 Professional Engineers (10p)
95 Shipbuilding and Ship repairing (12½p)
100 The Scientist (16p)
107 Coalmining (12½p)
109 Mathematical, Statistical and Computer Work (11p)

7 Bibliography

113 Glass Manufacture (9p)
110 Building and Civil Engineering Contractors (12½p)

Main Areas of Graduate Employment, Careers for Graduates series: published by University of London Careers Advisory Service, 49 Gordon Square, London WC1H 0PQ, price 15p. Other titles in this series, all priced at 15p, of interest to engineers and scientists, are:

No.
3 Computer Work
13 Mechanical Engineering
14 Electrical Engineering
15 Civil and Structural Engineering
16 Biology and Microbiology

Beyond a Degree: published by the Careers Research and Advisory Centre as Volume 3 of the CRAC/CBI Yearbook of Education and Training Opportunities: price £2·10 (Student edition 75p).

Relates degree subjects to the fields of employment which graduates in these subjects may enter, showing (very ingeniously) how relevant the degree is to the particular career in question. Also gives a brief survey of each degree subject as a basis for a career and shows which field of employment graduates in that subject entered in the previous year. Ends with a section on actual employment opportunities with large firms.

Industry and Careers: A study of British Industries and the Opportunities they offer: edited by D. L. Wheatley, published by Illiffe in 1961: price £2·75. Still an excellent book for anyone wanting to find out about industry and the scope for careers in industry.

Professional Careers for Graduate Scientists and Engineers by J. Callaghan: published by Classic Publications: price £1·25.

Careers in Biochemistry: published by the Biochemical Society, 7 Warwick Court, Holborn, London WC1R 5DP: price 17p.

Biology as a Career: published by the Institute of Biology, 41 Queen's Gate, London SW7: price 20p.

Careers in Building: published by Museum Press. price 80p.

Looking to Chemistry for a Career: published by Royal Institute of Chemistry, Russell Square, London WC1, free of charge.

The Training Guide: published by Royal Institute of Chemistry (October 1972): price about 20p.

Chemistry and the Chemical Industries: published by Cornmarket Press in the Your Career series: price 20p.

A Career in Civil Engineering: Careers Books series published by Museum Press: price 75p.

CIVIL SERVICE
Careers for School Leavers, Posts in Government Service
Careers for Graduates, Posts in Government Service
The Scientific Civil Service
Engineering Cadets in Government Service
Career Opportunities in the Diplomatic Wireless Service
All the above free of charge from Civil Service Commission, Basingstoke, Hants.

Working with Computers: published by the National Computing Centre Ltd, Quay House, Quay Street, Manchester M3 3HU: price 60p.

Computers: by F. Verrinder: Your Career series published by Cornmarket Press: price 20p.

Engineering: by N. Fountain: Your Career series published by Cornmarket Press: price 20p.

Making Electric Things Happen: The Career of a Chartered Electrical Engineer by P. L. Taylor: My Life and My Work series published by Educational Explorers: price £1·05.

Electrical Engineering: by Kay King: Your Career series published by Cornmarket Press: price 20p.

Of Men and Machines: Mechanical Engineering as a Career by George Stevenson: My Life and My Work series published by Educational Explorers: price £1·05.

Mechanical Engineering: by P. Mason: Your Career series published by Cornmarket Press: price 20p.

Passport to Adventure: A Career in the Merchant Navy: published by British Shipping Federation Ltd, 146–150 Minories, London EC3N 1ND, free of charge.

The Dustless Road: A Career in the Merchant Navy: by S. J. Harland: My Life and My Work series published by Educational Explorers: price £1·05.

Metals in the Service of Man: by W. Alexander and A. Street: published by Pelican Books: price 30p.

Mines and Men: Mining Engineering, by T. Ellis: My Life and My Work series published by Educational Explorers: price £1·05.

Pharmacy as a Career: published by the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London WC1: free of charge.

Laboratory Technician: by D. Dillon: Your Career series published by Cornmarket Press: price 20p.

Why Research? A Research Scientist and his Work by I. W. Wark: My Life and My Work series published by Educational Explorers: price £1·05.

Statistics as a Career: published by the Institute of Statisticians, 55 Park Lane, London W1: price 17p.

My Statistics are Vital: A Statistician's Life and Work by Madge Dugdale: My Life and My Work series published by Educational Explorers: price £1·05.

Teaching: by Barbara Priestley: Your Career series published by Cornmarket Press: price 20p.

The Scientist as Teacher: published by Department of Education and Science: free of charge.

Publications of Professional Institutions
Most of the professional bodies listed in Section 5 issue careers publications. Not all of these are included here, and students are advised to write direct to the institutions in which they are interested asking to be sent their literature.

ADDRESSES OF PRINCIPAL SUPPLIERS:

Careers Research and Advisory Centre,
Bateman Street, Cambridge CB2 1LZ

Cornmarket Press Ltd,
42 Conduit Street, London W1R 0NL

Department of Education and Science,
Curzon Street, London W1Y 8AA

H.M. Stationery Office,
49 High Holborn, London WC1V 6HB

8 Glossary

of abbreviations and terms in general use in technical education

Technologist
The technologist has degree level qualifications in engineering, science or mathematics, and normally becomes a member of the relevant professional institution.

Technician
The technician, unlike the craftsman, is not confined to the practice of a trade. He does responsible work involving decision-making within a framework of established practice, qualifying via the O.N.C. and H.N.C. or sometimes by specialist courses such as those provided by the City and Guilds of London Institute. A man with H.N.C. is defined as a Technician Engineer, as distinct from an Engineering Technician who has O.N.C. or a C. & G. Certificate (see below).

Day release
Part-time day release courses are arranged by technical colleges in conjunction with local industry, and the employer releases the student for a day each week without loss of pay for attendance at the college.

Block release
The employer allows periods of full-time release, usually of several weeks' duration each year, but not as long as the six months involved in a sandwich course. The use of block release for technician training is expanding rapidly.

Sandwich Courses
These involve alternate periods of full-time study at college and in practical training in industry, leading to the H.N.D. or a degree.

The *thin sandwich* usually means six months of each of the four years of the course spent in industry, and six months at a technological university, polytechnic, or college of technology. There are a number of variations on this pattern at the different colleges.

The term *thick sandwich* is frequently used to denote an undergraduate apprenticeship or 1:3:1 course, i.e. a preliminary year in industry, three years full-time at university with industrial training in the long vacations, and a year of postgraduate training, We have used it in this sense in this brochure. Strictly speaking, however, a thick sandwich is a 2:1:1 course for a C.N.A.A. degree, i.e. two years' full-time at college, a year in industry, and a final specialist year at college.

College-based students are those on sandwich courses who are not sponsored by an employer, but for whom the necessary periods of practical training are arranged by the college authorities.

Industry-based students are those sent on sandwich courses by their employers, whether or not they are sponsored financially while undergoing the academic part of the course.

O.N.C.
The Ordinary National Certificate is a two-year course for those in employment, who are allowed a day free each week for attendance at college. Increasingly, it is taken on a block release basis (see above) as this is found to produce better results. It requires 'O' level (or C.S.E. Grade 1) in four subjects including Mathematics and an appropriate science. It can be taken in Construction, Engineering (which includes both Mechanical and Electrical Engineering), Mining, Nautical Science, Naval Architecture and Shipbuilding, Printing, Sciences, Surveying, and Textiles. It is mainly a qualification for those intending to become technicians, but an O.N.C. at a good standard can qualify for a sandwich or full-time degree course.

H.N.C.
The Higher National Certificate is a senior technician qualification obtainable by two years' study with day release. Entry qualifications are O.N.C. or O.N.D., or, in some cases, including Chemistry, Metallurgy, Physics, Biology, Mathematics, Chemical Engineering and Foundry Technology, holders of suitable 'A' level sciences are acceptable. The H.N.C. man is regarded as a Technician Engineer, as distinct from an Engineering Technician.

There is no direct entry for 'A' level candidates to the

H.N.C. course in Civil, Electrical or Mechanical Engineering. The H.N.C., however, offers suitable basic training for eventual membership of various professional bodies outside engineering, such as the Royal Institute of Chemistry, the Institute of Metallurgy, or the Institute of Physics; but some further study is required. The H.N.C. in Engineering, with two Distinctions or three endorsement subjects, can exempt the holder from the Part 1 Examination of the Council of Engineering Institutions (see p. 77).

O.N.D.
The Ordinary National Diploma is a two year sandwich or full-time course requiring 'O' level (or C.S.E. Grade 1) in four subjects including Mathematics and an appropriate science. Like the O.N.C. it is a technician qualification which can lead to a degree or H.N.D. course.

H.N.D.
The Higher National Diploma is a three-year sandwich course (but can be taken as a two-year full-time course) requiring five G.C.E. passes, including two subjects studied to 'A' level and one passed at 'A' level. It is obtainable in Mechanical, Production, Aeronautical and Electrical Engineering, and in Building, Chemistry, Textiles, Physics, Mathematics, Mining, Metallurgy, and Printing.

The H.N.D. exempts students from Part 1 of the Council of Engineering Institutions' Examination. Selected students can, after a year's further study, sit Part 2 and qualify as Chartered Engineers. The H.N.D. also provides, with some further study, suitable basic training for membership of professional bodies such as the Royal Institute of Chemistry, etc.

C.N.A.A.
The Council for National Academic Awards was set up by Royal Charter in 1964 to award degrees to students completing approved courses of higher education outside the universities, and it is the only organisation in the country (apart from the universities) which can award first degrees. Most, but not all, of the courses are on a sandwich basis. For a full list of first degrees obtainable under the Council's auspices at polytechnics and colleges of technology, together with entrance requirements and an outline of each course, the student is referred to the C.N.A.A. *Compendium of Degree Courses* (see Section 7, Bibliography).

C.E.I.
Council of Engineering Institutions: see p. 77 for details.

C.Eng.
The title 'Chartered Engineer' may be used by corporate members of the professional engineering institutions in membership with the C.E.I. (see p. 77).

C.G.L.I. and C. & G. Certificate
The City and Guilds of London Institute offers courses (some full-time, some part-time and some evenings only) in more than 200 subjects relevant to particular industries. There are craft certificates (which can lead on to technician courses), and technician certificates, for school leavers who have less than the requisite number of 'O' levels for entry to O.N.C./D. A technician trainee can either start on a G course (see below), or (if qualified) can take a C. & G. technician course in two or three stages which leads to the C. & G. full technological certificate. There is a bridge from the latter qualification to H.N.C.

T courses
City & Guilds technician courses are often referred to as T courses.

G courses
These are general courses of a diagnostic nature lasting one or two years, for students who wish to become technicians but have not the necessary qualification for O.N.C. or for a T course. Whether the course lasts one or two years depends on the entrance standard reached. If the student was a near-miss for the entrance standard for O.N.C., he would probably take a one-year G course. On passing the G examination at 'credit' level, he would go on for O.N.C. or O.N.D. If he achieved a bare pass, he would take a C. & G. technician certificate, in which he would start in the second year. If he failed his G examination, he would start in the first year of the technician course. To reach C. & G. full technological certificate is likely to take about five years.

Public Schools Appointments Bureau

Director	R. F. B. Campbell, M.A.
Secretary	Joan Hills, B.A.
Administrative Secretary	Wg. Cdr. I. L. B. Aitkens R.A.F. (Ret'd.)
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